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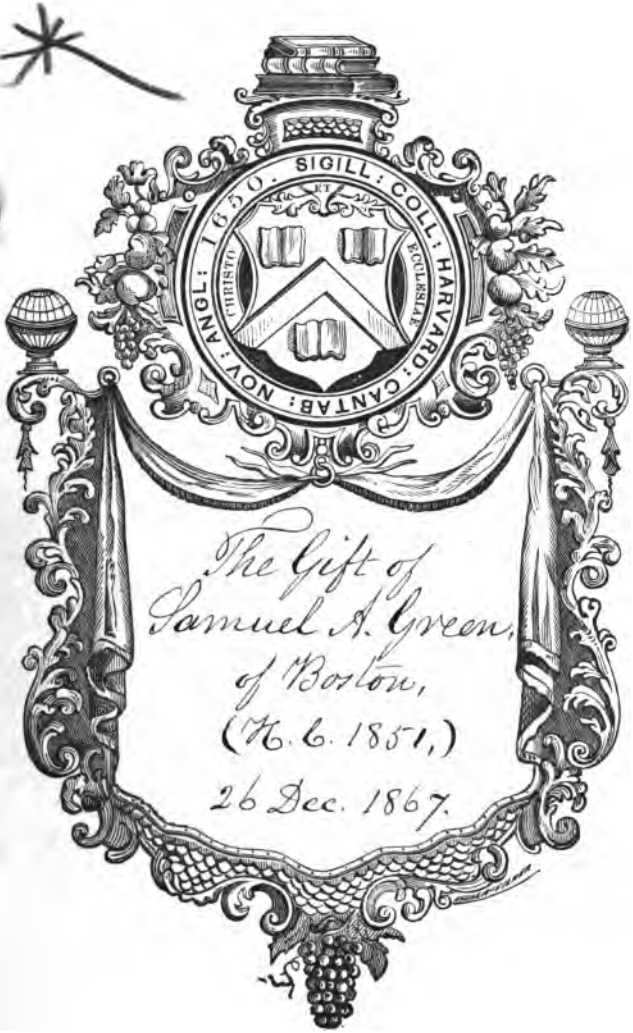
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A

HAND-BOOK

OF

OBSTETRICS.

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OF

OBSTETRICS:

With Forty-One Illustrations.

BEING A PORTION OF

AN ANALYTICAL COMPENDIUM

OF THE

VARIOUS BRANCHES OF MEDICINE.

BY

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OBSTETRICS.

OF THE BONES OF THE PELVIS.

THE pelvis is an irregular bony cavity, situated at the base of the spinal column, and above the inferior extremities, with which it is connected by muscles and articulations, and for which as well as for the muscles of the trunk, it constitutes "a point d'appui."

When divested of its soft structures, this organ somewhat resembles a basin, and hence its name; for the Greeks called it πελυξ, a wooden utensil of bowl-form; the Latins from them derived the word *pelvis*, which is the term generally adopted by English and American writers. The French call it *le bassin*, the Italians *el bacino*,—all which words have the same signification.

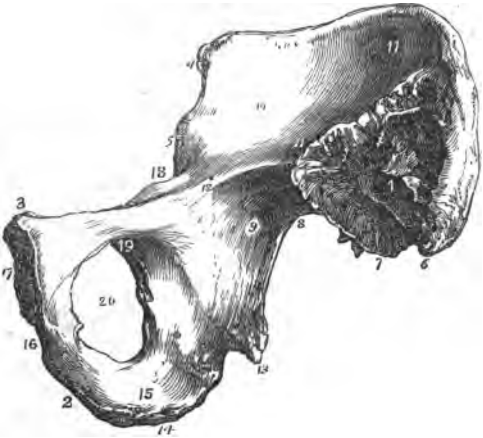
In the adult, the pelvis consists of four parts, viz.: two *ossa innominata*, the *os sacrum*, and the *os coccygis*, but in early life they are more minutely divisible.

Each *os innominatum* at an early period of intra-uterine life consists of cartilage only. Subsequently bony depositions take place, which at birth have coalesced so as to form three bones separated by cartilage, viz.: the *Ilium*, the *Ischium*, and the *Pubis*. The process of ossification continues till these three bones meet in the acetabulum, two-fifths of which are formed by the ilium, two-fifths by the ischium, and one-fifth by the pubis.

The breadth of each *os innominatum*, from the *anterior superior spinous process* to the *posterior superior spinous process* is six inches, and the height from the *tuber ischii* to the *crest of the ilium*, is seven inches.

Os ilium, *hip*, or *haunch bone* (Fig. 1), is the largest of the three divisions of the *os innominatum*, and is uppermost in position. It has an *outer* and an *inner* surface; the *outer*[1] is called *dorsum*, and is irregularly convex, and marked by eminences and depressions affording attachments for the glutæi muscles. The *inner*[10] is concave and smooth, and is called *venter;* it is occupied by the iliacus internus muscle. The *lower* portion, the *base*, or *body*,[5] is the thickest part of the bone, and enters largely into the composition of the acetabulum, a cavity for the reception of the head of the femur. Just above the base, the bone narrows into a kind of neck, from which springs the *ala* or *wing*. The ala terminates superiorly in a ridge running along its whole extent, called the *crista ilii*, or crest of the ilium. To different parts of the *crest* are attached the oblique and transverse abdominal muscles, the latissimus dorsi, the erector spinæ, and the quadratus lumborum. It terminates *anteriorly* in

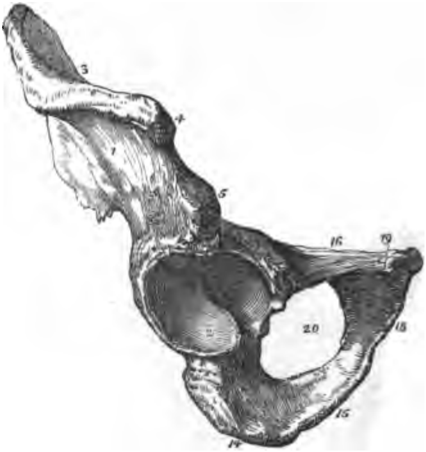
Fig. 1.



the anterior superior spinous process, and *anterior inferior spinous process,*[4] [5] and posteriorly in the *posterior superior* and *inferior spinous processes.*[6] [7] The *anterior superior spinous process* gives attachment to one end of *Poupart's* or *Gimbernat's* ligament, the *tensor vaginæ femoris,* and the *sartorius muscles.* From the anterior inferior arises the longer portion of the rectus femoris. Into the *posterior* are inserted strong ligaments, which bind this bone very firmly to the sacrum. Below the posterior inferior spinous process there is a deep arch, the *sciatic notch,* which is divided by ligaments into the two *sciatic foramina;* through the *upper,* which is the larger, pass the gluteal, sciatic and pudic arteries, the sciatic and pudic nerves, and the pyriform muscle; through the *inferior,* the pudic arteries and nerve re-enter the pelvis, and the obturator internus muscle passes out. The posterior part of the crest is very rough, and marks the connexion between the ilium and sacrum, called the *sacro-iliac symphysis,* of which there is one on each side of the sacrum. The body of the bone is divided from the ala internally by a ridge running horizontally,[12] forming a portion of the *pelvic brim, linea innominata,* or *linea ilia.* The ilium is connected with the ischium and pubis in the acetabulum, and posteriorly with the sacrum.

Os ischium, is the second in size, and lowest in position of the divisions of the innominatum. It is noted for a *base* or *body,* a *spinous process,* its *tuberosity,* and *ascending ramus.* The base, or

Fig. 2.



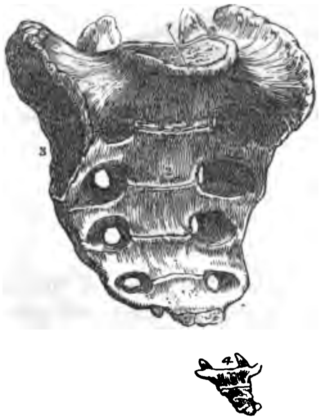
body (Fig. 2[2]), forms the inferior portion of the acetabulum, and is the thickest part. Below this is a narrowed portion called the *neck;* from this a pyramidal process juts out called the *spine,* or *spinous process,* affording attachment to part of the *sacro-sciatic* ligament. It varies in length and direction, and is at times of importance obstetrically, from the impediment which it occasionally offers to the descent of the child's head. In its descent from the neck, the bone bulges out into a protuberance called *tuber ischii,*[14] and turning upwards at an acute angle, becomes the *ascending ramus* of *the ischium.*[15] The internal surface of this bone is smooth and even, and forms one of the *inclined planes* of the pelvic cavity; the external is rough, and gives attachment to the sacro-sciatic ligament, and several muscles. The ischium is connected with the ilium and pubes in the acetabulum, and articulated with the sacrum by ligaments.

Os pubis, is the smallest and most anterior of the three divisions. It has a *base,* a *body,* two *rami,* a *horizontal* and a *descending,* a *spinous process,* and a *symphysis.* Its *base* is the thickest part, and forms the *anterior* and *smaller portion* of the acetabulum, beyond which the bone narrows, and proceeding forwards forms the *horizontal ramus* (Fig. 2[16]). This terminates in a wider sheet, and its edge, the point of junction with its fellow bone, is called the *symphysis pubis* (Fig. 1[17]). From the inferior part of the symphysis, the *descending ramus* (Fig. 2[18]) proceeds downwards to meet the ascending ramus of the ischium, and with it forms one side of the *arch of the pubis.* On the interior, running along the upper margin of the horizontal ramus, is a ridge, called the *crest* of the pubis, or the *linea pectinea,* which, by its junction with the *linea ilia,* forms the *linea ilio pectinea,* and at its pubic extremity is a small spinous process, affording an attachment to the pubic end of *Poupart's ligament;* whilst the inner and outer edges of this portion of the bone afford insertion to the abdominal muscles. The os pubis is connected with the ilium and ischium in the acetabulum, with the ascending ramus of the ischium, and with its fellow, by the symphysis. In the *anterior part* of the os. innominatum is seen the *obturator foramen*,[20] formed by the ischium and pubis, which is nearly filled in the recent state by the obturator ligament; through the hole at the superior part pass the obturator vessels and nerve. The object attained by this arrangement is lightness of structure where strength is not needed.

Of the three bones, the ilium forms part of the brim of the pelvis but none of the outlet; the ischium part of the outlet, but none of the brim; whilst the pubis forms part of both brim and outlet.

Os sacrum terminates the vertebral column; in form it is triangular with the apex of the pyramid downwards, and rather backwards. It is the lightest bone in the body when its size is considered, and is spongy in structure. It has *four* surfaces, an external and internal, and two lateral, is about four and a half inches in length, four inches in width, and its greatest thickness is about two and a half inches. The *external surface* is convex and rough, and has three or four processes like those of the vertebræ, which may be called *the spinous processes of the sacrum;* anterior to these we find a hollow cavity for the reception of the *cauda equina*, with four holes on each side, which communicate with the cavity, for the transmission of nerves. The *internal surface* (Fig. 3 [2]) is smooth and concave to the depth of half an inch, and crossed by four transverse white lines, which mark the former division of its bones by cartilage. There are also four pairs of holes on this surface, which transmit nervous filaments, which afterwards form part of the great sciatic nerve. The upper edge of this bone completes the brim of the pelvis, and from the projection of the central part it is called the *promontory of the sacrum.*[1] The *lateral surfaces*[3] are rough and uneven, the irregularities corresponding with those on the ilium, and forming with them the *sacro-iliac symphysis.*

Fig. 3.

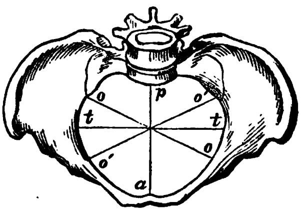


Os coccygis, is attached to the apex of the sacrum, and is so named from its resemblance to the beak of a cuckoo.[4] It is composed of three or four pieces, which play upon each other by separate joints, and is of much importance in obstetrical study. The lesser sciatic ligament and the ischio-coccygeal muscles are inserted into it.

Divisions of the pelvis.—The pelvis is divided into the true and false; the upper and the lower; and the greater and the lesser, by the *linea ilio-pectinea,* all above that line being the upper, the greater, or false pelvis, all below receiving the other denominations. The *upper pelvis,* or *pavilion,* is completed by the abdominal muscles, the ilio-lumbar ligament, and the last two lumbar vertebræ. The *lower* or *true pelvis* is of the most importance to obstetricians, and is divided into *brim, cavity* or *excavation,* and *outlet.*

The *brim* or *superior strait,* is *defined* by the symphysis pubis, the horizontal portion of the body of the pubis, the spinous process of the pubis, the linea pectinea, the ilio-pectineal eminence, the linea ilia, the sacro-iliac symphysis, and the promontory of the sacrum, and is shaped like the heart on a playing card. It has *three diameters,* an *antero-posterior,* called also, *straight* or *conjugate,* from the promontory of the sacrum to the inner edge of the symphysis pubis, which measures about four inches. (Fig. 4, *a, p.*) The *transverse,* across the widest part of the brim, and at right angles to the antero-posterior, is about five inches, and a quarter.(*t t*) The *oblique,* from the *sacro-iliac junction* on either side to the opposite side of the brim above the acetabulum, five inches.(*o o*)—These measurements are of course less in the living body in consequence of the presence of the soft structures. The circumference of the brim is about thirteen inches.

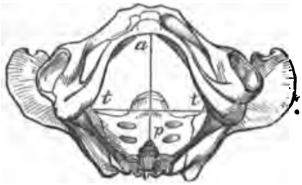
Fig. 4.



The true pelvis is the *cavity* or *excavation* included between the *brim* and the *outlet,* or between the superior and inferior straits. It is an inch and a half deep in front, three and a half at the side, and five inches from the sacral promontory to the tip of the coccyx. The cavity of the true pelvis resembles a bent cone in shape, and its orifices being somewhat narrowed are called *straits.* A line drawn from the inferior part of the symphysis pubis to the promontory of the sacrum, measures four and a half inches; from the same point to the hollow of the sacrum, four and three-quarter inches. The oblique measurement of the cavity from the tuber ischii to the sacro-iliac junction, measures six inches.

The *outlet,* or *inferior strait,* is of an irregularly oval shape, and its diameters are the reverse of those of the superior strait; thus, the antero-posterior diameter, from the arch of the pubes to the tip of the coccyx, is four to four and a half inches. (Fig. 5, *a, p.*) The transverse, from one tuberosity to the other, is four inches (*t t*). The outlet is bounded by the tip of the coccyx at the back, by the lower edge of the under fasciculus of the sacro-sciatic ligaments posteriorly and laterally, by the tubera ischii at the sides, by the rami of the ischia and pubes anteriorly and laterally, and by the symphysis pubis in front. Its circumference is about twelve inches.

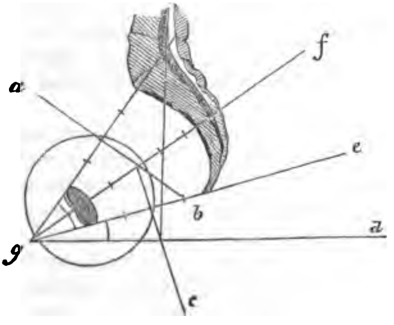
Fig. 5.



The planes of the straits.—If a piece of card or paper be cut so as to fit within the anatomical boundary of the superior strait, it will represent the *plane* of that *strait.* Now hold the pelvis in the position it occupies when the individual is either sitting or standing, and it will be found that the plane of the strait has an inclination of about thirty-five degrees, which may be increased or diminished at will by extending or flexing the lumbar vertebræ. The plane of the *inferior strait* may also be described in the same way, viz.: by fitting a card into it. It will be found that they incline towards each other anteriorly, and would meet, if produced, about one and a half inches in front of the pubes. The whole position of the pelvis in regard to the trunk of the body is *oblique,* so that a line drawn through the trunk in the direction of its axis would, in falling downwards, strike on the centre of the symphysis pubis.

Axes of the pelvis.—There are two axes of the pelvis, one of the brim or superior strait, which is a line drawn perpendicular to the *plane* of that strait, and, if produced, would extend from the coccyx to a little above the umbilicus; the other, of the *outlet* or *inferior strait,* which is a line drawn perpendicular to the plane of that strait, and, if produced, would extend from the promontory of the sacrum to the central space between the tubera ischii. The axes of the upper and lower straits of the pelvis form an obtuse angle with each other. By combining these axes with the inclination of the pelvis we can obtain a correct notion of the *direction* of the *canal* of the *pelvis,* which, it will be readily seen, is curved. By having a correct knowledge of the axes of the trunk and pelvic entrance, the obstetrician is enabled to place his patient in the position most favourable to the ready descent of the child's head through the brim into the excavation. The direction of the axis of the pelvis will be better understood, perhaps, by a description of "*Carus' curve.*" If one leg of a pair of compasses be set on the posterior edge of the symphysis pubis,

Fig. 6.



in a bisected pelvis, and the other one be opened two and a quarter inches, a circle may be drawn through *g f*, *g e*, *g d*, (Fig. 6,) to the point of departure. This circle will represent Carus' curve, and will very nearly coincide with the axis of the pelvis. As the child's head moves through the excavation, its central point coincides with this curve, and if the head of the child should continue after birth to move in the same curve it followed while in the pelvis, it would come back to the point of departure at the centre of the plane of the superior strait. But if the head depart from the coincidence with this curve, either in an unassisted or an instrumental labour, the soft parts of the mother will be greatly endangered. Fig. 6 represents "Carus' curve."

The inclined planes of the pelvis.—These are four in number, an *anterior* and a *posterior* on the right side, and an *anterior* and *posterior* on the left side. To demonstrate them, let two vertical cuts be made through the lesser pelvis, and at right angles to each other. The first should be made through the symphysis pubis, and the median line of the sacrum and coccyx, and the second, or transverse, should commence behind the tuberosity of the ischium on either side, and run upwards perpendicularly through the apex of the spine of the ischium, intersecting the *linea ilia* three-quarters of an inch in front of the sacro-iliac symphysis. The direction of these inclined planes is such, that the child's head moving on them will necessarily rotate either under the symphysis pubis, or into the hollow of the sacrum. By these two vertical cuts there will be an *anterior* and *posterior* inclined plane demonstrated on each side of the pelvis, of which the anterior will be the longer.

The muscles within the pelvis deserve notice; for, by being pressed on during the escape of the child's head, they are sometimes strained, and pain is experienced in moving the thigh, and in evacuating the rectum, for some days subsequent to labour. *The levator ani*, one on each side, of the shape of a fan, rises from the pubes just below the brim, the aponeurosis covering the obturator internus, and the spinous process of the ischium, passes down by the side of the vagina, and is inserted into the sphincter ani. On dissecting away these fibres, we observe the *obturator internus;* which, taking its origin from the inner surface of the obturator ligament, and a portion of both the pubes and ischium in the neighbourhood of the foramen, sends off a tendon, which, running round the ischium like a pulley, passes out of the pelvis through the smaller sacro-sciatic foramen, and is inserted into the fossa trochanterica at the root of the trochanter major. *The pyriformis* arises from the anterior surface of the second, third, and fourth divisions of the sacrum, escapes from the pelvis through the larger sacro-sciatic foramen, and is also inserted into the fossa trochanterica, near the insertion of the obturator. *The coccygeus* springs from the spinous process of the ischium, and is attached to the side of the coccyx through nearly its whole extent. *The transversus perinei* rises from the side of the tuber ischii, and is lost upon the sphincter ani, sphincter vaginæ, and the structure of the perineum itself.

Difference in Form between the Male and Female Pelvis and Skeleton.—On comparing the male and female pelves together, we cannot but remark a striking difference in the general appearance and particular proportions of this organ in the two sexes. We observe that the pelvis of the female is altogether larger and more delicately shaped than that of the male; that the alæ of the ilia spread themselves widely in the lateral direction; while the same parts in the male rise more perpendicularly upwards. The brim is differently shaped; the long diameter in the female being from side to side; in the male from before backwards. The cavity is considerably smaller in the male, deeper, and more of a funnel shape, the sacrum being much straighter, and the tuberosities of the ischia inclining closer together. The outlet is also far less capacious; and this arises principally from the approximation of the ischia, which seldom are more than three inches distant at the widest diameter. The arch of the pubes is formed more angularly than in the female, in whom this part approaches nearer to the perfection of an arch. In the female, too, the rami of the ischia and pubes are smoother on their inner surface, and their anterior edge is turned more outwards. The disposition of the rami helps to enlarge the outlet, and gives an elegance to the whole organ that is wanting in the pelvis of the stronger sex.

All the bones of the male skeleton are firmer and heavier than they are in the female, and more powerfully marked by those irregularities which indicate muscular attachments. The thoracic cavity is comparatively larger, and the acromia are at a greater distance from each other. A line drawn from the head of the humerus, perpendicularly downwards, would fall to the ground altogether clear of the pelvis; but in a well-articulated female skeleton, the same line would rest within the ala of the ilium. It is this difference that gives the broad shoulders to the male, and the swelling hips to the female, and occasions the principal distinction in the outline of the form between the sexes.

OF THE FŒTAL HEAD.

The head is of an oval shape, and largest at its occipital extremity; so that in vertex presentations the largest end necessarily descends first, and its smallest circumference, which is about ten and a half inches, will be nearly parallel to the successive planes of the canal. It is the largest part of the child, and its lateral and superior parietes are most compressible. The bones of the head which require our study are the two *parietal*, the *frontal*, which is divided into two, the *occipital*, and the two *temporal*, for a minute description of which see ANATOMY. The bones of the child's head are not dove-tailed into each other as we find them in the adult, but are separated to some extent by intervening lines and spaces of membranous formation; the lines are called *sutures*, the spaces *fontanelles;* from their having been supposed to distil a moisture, they are also called *bregmata*, from βρέχω, to moisten. The sutures are the *coronal*, *sagittal*, *lambdoidal*, and *squamous*. At the two extremities of the sagittal suture are the two fontanelles, the *anterior* and *posterior*, named from their position. The anterior is the larger, and is of a quadrangular shape; it is formed by the rounding off of the four corners of the two frontal and the two parietal bones. The posterior is triangular, and formed by the union of three bones, the superior posterior angles of the two parietal, and the upper angle of the occipital. A knowledge of these fontanelles is of great importance in the practice of midwifery, as they are the chief means of diagnosticating the position of the child's head in labour. The great advantage gained from this arrangement of the child's head, is that it allows a more uniform growth and development to the brain than could have taken place had the cranium been solid, and what is perhaps of greater importance, it allows the bones to overlap, and thus permits a certain amount of compression, which enables the head to be pushed through a smaller space than if it had been formed of one continuous piece.

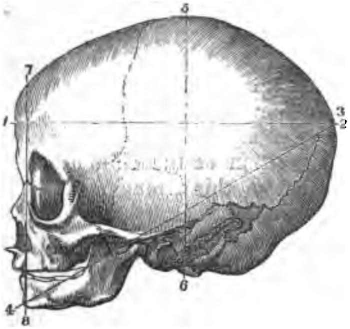
The dimensions of the fœtal head have been variously stated by obstetrical writers, each basing his report upon the result of his own observations. The following table is the best average.

The longitudinal or occipito-frontal diameter, Fig. 7,$^{1\,2}$ is from	4 in. to 4½ in.
The transverse or bi-parietal, from one parietal boss to the opposite	3½ to 4
The occipito-mental, or oblique,$^{3\,4}$.	5 to 5½
Cervico-bregmatic,$^{5\,6}$ drawn from a point midway between the foramen magnum of the occipital bone and the external occipital cross to anterior fontanelle, ...	3½ to 4
Bi-parietal, ...	3½ to 4
Trachelo-bregmatic, from the basilar process to the front part of bregma, ...	3½
Fronto-mental,$^{7\,8}$	3
Bi-malar, ...	2½
Bi-temporal, ...	2¼
Sagitto-mental, from chin and middle of sagittal suture, ...	4¾
Cervico-frontal, from midway between occipital cross and foramen magnum to forehead, .	4 compressible to 3
The fronto-mental,$^{7\,8}$	3 to 3½
The transverse diameter of the shoulders, . .	4 to 5 reducible to 3
" " " " hips, .	4 to 5

In general, it may be observed that all the measurements are larger in male than in female children.

Regions of the head.—Vertex. A circle of an inch and a half in radius around the posterior fontanelle as a centre. *Top of the head.*—Sometimes called the bregmatic region; besides which the terms *lateral*, *chin*, *face*, *forehead*, *base*, are used to define different regions of the head which may present. By the *base* is understood all the immoveable parts of it, viz.: the sphenoid in the centre, the temporal bones laterally, together with the bones of the face. The *anatomical* base is incompressible, the *obstetrical* base is compressible.

Fig. 7.

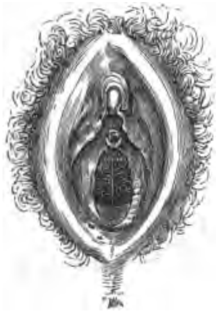


It is generally remarked that the skull of the male child is a little larger in all its diameters than that of the female. Of sixty male and sixty female children, born at full time, Dr. Jos. Clarke found the average circumference of the head to be 14 inches in the males; 13⅝ths in the females. The arch, from ear to ear over the crown, was 7¼th in the males, 7 th in the females. Of the 120 examined, only six exceeded 14½ inches round, and all these were males.

OF THE ORGANS OF GENERATION.

These are generally divided into the *external* and *internal*. The external consist of the *mons veneris*, *labia externa*, *perineum*, *clitoris*, *nymphæ*, *vestibule*, *meatus urinarius*, *hymen* in virgins, and *carunculæ myrtiformes* in matrons. The internal are the *vagina*, *uterus*, and *uterine appendages*, which latter are the *broad ligaments*, *round ligaments*, *two ovaries*, and *two Fallopian tubes*.

Fig. 8.



The *mons veneris* (Fig. 8) is placed at the lower part of the abdomen, and upper part of *symphysis pubis;* it consists of dense fibro-cellular, and adipous tissue, and is covered, in the adult, with hair, among the roots of which are numerous sebaceous follicles.

The *labia externa* are two folds of skin and mucous membrane, which commence in front of the symphysis pubis, and extend downwards and backwards to the perineum, where they again meet. The superior junction is called the *anterior commissure* of the vulva, the posterior, is called the *posterior commissure.* Their texture is principally *cellular* and *vascular,* and their use is to protect the organs situated between them. The *perineum* extends from the lower union of the labia externa backwards towards the anus. It is composed principally of highly distensible cellular tissue, but does not possess a great deal of fat, and the skin is very scantily supplied with hair; it is somewhat triangular in shape, and its medium breadth in women who have not borne children is from an inch to an inch and a half, being narrower, of course, in women who have. It is capable of great distension.

The *nymphæ, labia interna* vel *minora,* arise from nearly the same point, at the anterior commissure, and run downwards and backwards about an inch, to the middle of the orifice of the vagina, where they are lost in the general lining of the labia externa. They are covered with mucous membrane, and consist of cellular and erectile vascular tissue, and do not disappear during the distension of the external parts by the escape of the child's head.

The *clitoris* is seated just below the point of junction of the nymphæ, and is the analogue of the male penis, excepting that it has no corpus spongiosum, and no urethra; it is erectile, and extremely sensitive.

The *vestibule* is a triangular space, bounded superiorly by the clitoris, and laterally by the nymphæ; it is covered by smooth mucous membrane, and at its lower portion we find the orifice of the urethra, easily recognised by its soft, prominent, circular rim.

The *urethra* is about an inch and a half long, dilatable, and extends from before backwards and upwards, running under and behind the symphysis pubis.

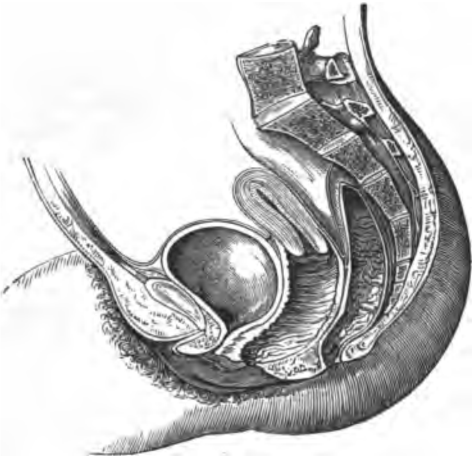
The *hymen* is a fold of mucous membrane, generally of a crescentic shape, with its concavity upwards, which is found just within the orifice of the vagina; it is generally ruptured at the first sexual intercourse, and its remains constitute what are known as the *carunculæ myrtiformes.* The space between the hymen and the fourchette is called the *fossa navicularis.*

The *external organs* in the aggregate are often spoken of under the name *pudendum.*

THE INTERNAL ORGANS.

The *vagina* is a musculo-membranous canal, extending from its origin in the vulva obliquely through the cavity of the pelvis to the uterus, in its progress describing a curve, which is greater even than that of the sacrum and coccyx, having the neck of the bladder, the urethra and the symphysis pubis anteriorly, and the rectum posteriorly. It is about four or five inches long, and three in circumference, being shorter and more capacious in those who have borne children. It has three coats, an external cellular, a middle muscular, and internal mucous. It is well supplied with blood-vessels, which are much multiplied and interlaced at its anterior extremity, constituting what is known as the *plexus retiformis*. Its mucous membrane is of a pink colour, and is arranged in transverse rugæ anteriorly and posteriorly, which allow great distension of the vagina. Its orifice is surrounded by a collection of muscular fibres, called the *sphincter vaginæ*. It is not much under the control of the will, however, as is shown by the inability to retain injections. At its superior and posterior portion, it receives a reflection of peritoneum. (Fig. 9.)

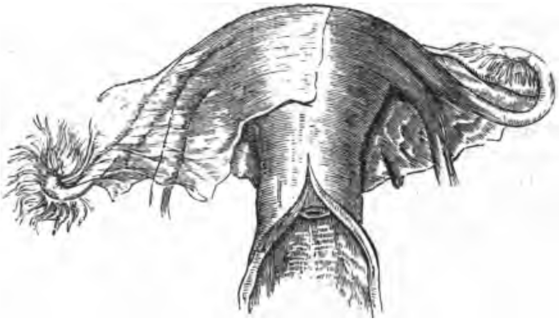
Fig. 9.



The *uterus* is placed at the upper part of the vagina, and hangs in the centre of the pelvis behind the bladder and before the rectum, with its long diameter parallel to the axis of the superior strait, and its superior edge a little above the brim of the pelvis. As the axis of the vagina is nearly parallel with that of the inferior strait, it meets the axis of the uterus at an obtuse angle; any deviation from which, implies a displacement of the womb. It is a hollow pear-shaped body, rounder posteriorly than anteriorly, about 2½ to 3 inches long, 2 inches wide, and very nearly an inch thick. Anatomists divide it into fundus, body, and neck. The fundus is that portion above the Fallopian tubes, the cervix is the inferior, cylindrical portion, and the body is that part between the fundus and cervix. (Fig. 10.)

The uterus has three coats, a serous, a muscular, and a mucous. It is covered anteriorly and posteriorly by peritoneum, which is reflected laterally to the sides of the pelvis, near the sacro-iliac symphysis, forming the *broad ligaments*, which serve to steady the uterus. The *middle coat* of the uterus is muscular, and classed among those muscles which are called *non-striated*, and which are also found in the middle coats of the arteries. There are three sets of fibres, circular, longitudinal, and oblique, which, by their contraction, tend to diminish the cavity and expel the contents of the uterus. The amount of muscular fibres is much increased during pregnancy.

Fig. 10.



The *internal coat* is generally considered to be a mucous membrane, though there are some obstetrical physiologists who deny it. It extends down into the cervix, whence it is continuous with that of the vagina; it also lines the Fallopian tubes. Its colour is a pale pink except during menstruation. The uterus is supplied with blood by the spermatic and uterine arteries, and with *nerves* from the *aortic plexus*, and from the *hypogastric nerves* and *plexus*, being a mixture of sacral and sympathetic nerves. The *cavity* of the uterus is triangular, its base being directed upwards, and the superior angle corresponding to the points where the Fallopian tubes enter it; in size it is about equal to a split almond, and the internal walls are nearly always in contact. Its inferior angle communicates with the vagina through the canal of the cervix, which is barrel-shaped, and from half to three-quarters of an inch long. The contraction at the upper extremity of the canal is called the *internal os uteri*, whilst that at the lower extremity is called the *os uteri* or *os tincæ;* the latter name from its supposed resemblance to the mouth of the tench. The *shape* of the os uteri varies, in some being transverse, and in others circular, or ragged; the latter especially in women who have borne children. In the mucous membrane of the cervix are found the *glandulæ Nabothi.*

The *broad ligaments* of the uterus are two duplicatures of peritoneum, one on either side, extending from the sides of the uterus to the ilia, in the line which divides the anterior from the posterior inclined planes of the pelvis; they act as *stays* to the uterus and contain the *Fallopian tubes*, which run along their upper margin, and the *ovaries*, which are enclosed in a posterior fold.

The *Fallopian tubes* are two cylindrical canals, about four inches long, which arise from the superior angle of the uterus. They open *obliquely* into the uterus, at which point the canal narrows; it afterwards expands, and again contracts at the point where it opens into the abdomen. In the unimpregnated state it is about the size of a bristle. Externally they are equally thick throughout, except at their terminal extremity, where they expand into a trumpet-shaped enlargement, called *fimbria*, or *morsus diaboli*, which applies itself to the ovary. They have three coats, an *internal mucous*, a *middle muscular*, and an *external serous*, or *peritoneal*, and they are looked upon as the excretory ducts of the ovaries.

The *ovaries* are two in number, and are the analogues of the male testis. They are situated on the posterior face of the broad ligaments, and are attached to the uterus by a ligament of their own, called the *ligamentum ovarii*. They are oval in shape, and have two coats, an external peritoneal, and an internal, the tunica albuginea. On removing these we come to the proper tissue of the ovary, called its *stroma*, which consists of dense cellular tissue, containing within its meshes or areolæ, numerous little vesicles named *Graafian vesicles*. These vary in number and size, the largest being generally seen near the surface of the ovary; they are found early in life, but are more developed about the period of puberty.

The Graafian vesicle has two coats, an *external*, the *tunic of the ovisac*, and *internal*, the *ovisac* (Barry). Within the cavity formed by these membranes is found, floating in an albuminous fluid, the *ovum* or *egg*, which is exceedingly small, and resembles in all its details the egg of the chick. The ovum also contains within its capsule or membrane, which is called the yolk membrane, a granular fluid termed the *yolk*, and in the centre of the yolk a little vesicle, the *germinal vesicle*, and on the walls of the germinal vesicle its nucleus is seen, named the *macula germinativa*, or germinal spot. As each Graafian vesicle rises to the surface of the ovary it bursts, and allows the contained ovum to escape, which is seized by the fimbriæ of the Fallopian tube, and transmitted to the uterus. The cavity of the Graafian vesicle (which still remains in the ovary), becomes filled up with a new deposit, which, being of a yellow colour, is called from that circumstance, *corpus luteum*, or *yellow body*. There is no correspondence between the number of corpora lutea found in the ovaries of a woman, and the number of children she may have borne, as ova are being constantly discharged irrespective of fecundation, hence the corpus luteum is no evidence of previously existing pregnancy.

MENSTRUATION AND ITS DISEASES.

By the term *menstruation*, is understood that function in the female economy by which a certain amount of sanguineous fluid is eliminated by the uterus, and discharged from the vagina every month. This discharge, from its occurring at this regular interval, is called the *menses*, or *catamenia*, and the female in whom it so takes place is said to be *regular*.

This function generally commences at the age of puberty, which in this country is about fourteen or fifteen, and lasts till about forty-five, when it disappears; to this latter period is often applied the terms, *critical period*, *change of life*, &c. During the whole of a woman's menstrual life she is capable of conceiving; after this, her reproductive function ceases. The approach of puberty is announced by other changes than those mentioned. The mammæ are developed, the form becomes rounded, the pelvis expands, and the pudendum is covered with a growth of hair. The influence of climate in promoting or retarding the approach of puberty, has been shown by recent observation, to be over-rated, the average period being about the same all over the world.

Mr. Roberton has attempted, and successfully, to show, that the age of puberty is about as early in the cold, as in the tropical regions of the earth; and, that were marriages to take place in England at as juvenile an age as they do in Hindusthan, instances of very early fecundity would be as common in England as they are in that country. He is of opinion, that early marriage and early intercourse between the sexes, where found prevailing generally, "are to be attributed, not to any peculiar precocity, but to a moral and political degradation, exhibited in ill laws and customs, the enslavement more or less of the women, ignorance of letters, and impure or debasing systems of religion." He has also shown, from statistical evidence, that menstruation does not occur more early in the negress than in the white female. Dr. Vaigas, of Caraccas, indeed, in a letter to Professor Meigs, of Philadelphia, affirms, that precocious menstruation is more common in the white than in the coloured.*

The flow generally returns every twenty-eight days, and lasts from four to six, and the amount discharged varies from four to eight ounces, though about this, there is no certainty, as every woman is a law to herself; what would be a profuse discharge in some, is merely normal in others. The first menstrual flow is generally preceded by languor, lassitude, pain in the back, headache, chilliness,

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* Dunglison's Human Phys., Seventh Edition.

&c., which generally disappear when the discharge takes place. The after occurrences are often unaccompanied by any premonitory or attendant symptoms. The theories that have been brought forward to explain the efficient cause of menstruation are too numerous, and too unsatisfactory to detain us here. The most popular is that which looks upon the maturation and escape of ova as the efficient cause. It is said that every twenty-eight days a Graafian vesicle rises to the surface of the ovary, and during its development and enlargement puts the tunica albuginea and peritoneal coat upon the stretch, and thus becomes a source of irritation; in consequence of which there is an afflux of blood to the parts (that is, to the ovaries, tubes, and uterus), which is discharged into the latter organ; the vesicle finally ruptures, the irritation is removed, and the flow ceases. This view is supported by Drs. Lee, Gendrin, Negrier, Pouchet, Raciborski, and others; but is denied by Dr. Ritchie and others, who contend that ova may be discharged without menstruation, and the reverse, that the maturation of ova is an *effect*, and not a *cause*. That the ovaries *are* concerned seems proved by the fact, that in their absence there is no menstrual flow. The blood that is discharged in menstruation is considered by Mad. Boivin to be identical with venous blood, and the opinion is adopted by Prof. Meigs and M. Dugés. Although there are many, and the larger number, who look upon it as altered blood, and deficient in fibrine, the first opinion would seem to be supported by the microscopic investigations of M. Donné and others. So far, therefore, as examinations go, they show, that there is much resemblance between the catamenial discharge and blood. M. Donné, indeed, affirms, that it appears to him to differ in no respect from blood; and, that if it occasionally has an acid reaction, in place of being alkaline like ordinary blood, this is simply owing to its being mixed with a great quantity of vaginal mucus, which is always extremely acid, while he affirms that the uterine mucus is always alkaline.

The uterus is congested during menstruation, so are the Fallopian tubes and ovaries; the vagina is relaxed and distensible, and the os uteri is soft, pulpy, and swollen. All of which conditions disappear when the flow ceases, and the parts return to the normal condition.

DISEASES OF WOMEN.

MENSTRUAL DISEASES.

Amenorrhœa.—By this term is understood an absence of the menstrual flow. There are two varieties: *emansio mensium*, when they have never appeared; and *suppressio mensium*, when, having once appeared, they have been arrested from any cause. The first may depend upon several causes, viz.: congenital malformation, as absence of the ovaries, uterus, or vagina, closure of the cervix, imperforate hymen, &c.; or, it may be dependent upon the health or habits of the patient. The diagnosis is not always easy; if malformation be suspected, recourse must be had to a per vaginam examination, and the defect, if possible, relieved by an operation. If the retention be dependent on constitutional causes, remove them. If the patient is of a full habit, venesection, mild diet, hip-baths, &c. When the reverse obtains, an opposite plan of treatment must be followed: tonics, as iron and its preparations, a generous diet, exercise, warm clothing, hip and foot baths; always bearing in mind that the woman is not *sick* because she does not menstruate, but that she does not menstruate because she *is* sick, or in other words that amenorrhœa may be merely a symptom of deranged health.

Suppressio mensium, occurs also in two forms: *acute*, when the discharge is arrested during the flow; as, by cold, emotions, &c.; and *chronic*, where it occurs in consequence of the acute, or from gradual failing of the health, disease of ovaries, and critical period, &c. The most important point in the early treatment is not to confound the disease with pregnancy. In the *acute form*, if there is much constitutional disturbance, venesection, or cups to the loins, laxatives, baths, and opium to relieve pains. In the *chronic form*, if possible, remove the cause: *tonics*, *aloetics*, and the means above mentioned; there being but a few direct emmenagogues.

Dysmenorrhœa.—Painful or *difficult menstruation.*—This may be dependent an a faulty condition of the system, upon neuralgia of the uterus, or an inflammatory state of that organ, or it may depend on mechanical constriction of the cervix. The discharge is often scanty, accompanied with great pain in the back, loins, fever, &c., and often with the elimination of membranous or shreddy coagula. The *treatment* during the paroxysm is antiphlogistic, as cups to the loins, revellents, baths, anodyne enemata. In the interval, tonics, if debilitated; alteratives, if inflammatory; and dilatation by the bougie, as recommended by Dr. Mackintosh, if there be stricture of the cervix. Females afflicted with this disease rarely conceive.

Menorrhagia, is an increase of the menstrual flow either in frequency or in quantity, and it may be either active or passive, the former occurring in robust plethoric habits, the latter in the reverse. The most common causes are nervous and vascular excitements, fevers, internal congestions, displacements of the uterus, and approach of the critical period, &c. It may be confounded with the hemorrhage arising from abortion, foreign growths, &c., within the uterus. The *treatment* varies; in persons of a full habit venesection may be necessary, rest, revulsives, saline laxatives, astringents, &c. In the interval, moderate diet, cold baths, &c. In debilitated cases, rest, tonics and astringents, and opium, good diet, &c. When the hemorrhage occurs about the critical period, it often resists the ordinary treatment. Under such circumstances, the *ergot of rye* often answers a good purpose. It may be given in doses of from 5 to 10 grs., twice or thrice a day. All stimulating and hot drinks should be avoided, and the patient kept in a horizontal position on a hard mattress. As soon as the discharge is entirely arrested, a blister should be applied to the sacrum, and kept open, and vaginal injections of cold water, or of a solution of acetate of lead, or other astringents, used two or three times a day. In taking the injections, the patient should assume the horizontal position, and endeavour to retain the fluid for a short time. If displacements exist, rectify them, avoid sexual excitement of all kinds, and employ warm clothing, frictions, &c.

Vicarious menstruation.—Seems a provision to obviate the ill effects of suppressed menstruation, by substituting a similar discharge from some other part. It occurs from various parts of the body, sometimes from the gums, nostrils, eyes, lungs, anus, stomach, or even from an amputated stump. The fluid sometimes resembles ordinary blood, at others, it has the characters of the catamenial fluid. It may occur at any time, and in any constitution. It is not, however, usually attended by any serious consequences.

Treatment.—After once occurring, the patient should be watched, and the system relieved by some other means; venesection, astringents, sedatives, mineral acids; and, if debilitated, tonics may be used.

Leucorrhœa.—An excessive and altered secretion of the mucus furnished by the membrane lining the vagina and uterus, by the follicles of the interior of the cervix uteri, and by the lacunæ of the vestibulum; generally white, or nearly colourless and transparent, sometimes yellow, or green, or slightly sanguineous, and of varying degrees of consistency. The amount of constitutional derangement depending on the severity of the affection, and the susceptibility of the patient (*Ashwell*).

The seat of the discharge may be diagnosticated by examining its characters. If it be of a jelly-like consistence, resembling partly coagulated albumen, and taking place at intervals, and in small quantities at a time, it probably comes from the muciparous follicles of the neck of the uterus.

If, on the contrary, it be of a whey-like or creamy consistence, and varying in colour from white to green, or brown, it probably comes from the mucous membrane of the vagina. In such cases the mucous membrane is commonly found studded over with red points, the inflamed orifices of mucous follicles.

There is sometimes an offensive sanious ichor discharged, whose origin is probably in the cavity of the uterus, or the Fallopian tubes themselves.

Acute vaginal leucorrhœa is accompanied by a sense of weight, heat and soreness in the vagina, tenesmus, irritation of the bladder, pain in the lower belly and thighs, &c. The discharge, at first thin and acid, becomes whitish, or yellowish, and more consistent. The occurrence of the discharge generally relieves the urgent symptoms.

Treatment.—If the patient be plethoric, bleeding should be practised, either general or local. Fomentations, rest, spare diet, and vaginal injections should also be used.

Chronic vaginal leucorrhœa is one of the most frequent diseases during menstrual life; sometimes, however, it precedes the menses. By most writers it is considered as a local disorder, inflammatory in its nature. It is frequently caused by cold, excessive coition, parturition, pessaries, displacements, and irritating food. There is seldom any pain accompanying it. If the discharge be great, weakness and pain in the back and loins may ensue.

The *treatment* consists in the use of depletory measures if required; the removal of pessaries; tonics if the patient be weak; opium if pain be present; and the use of the balsams and astringent injections.

The *uterine leucorrhœa,* which is also often accompanied by constitutional symptoms, requires the use of depletory measures at times, with the use of astringent injections, and tonics if the health be feeble, particularly the preparations of iron. A solution of nitrate of silver, applied by means of a speculum to the interior of the cervix uteri, has succeeded when other means have failed. Should there be any suspicion of a syphilitic taint, the remedies proper in such cases should be used.

HYSTERALGIA, OR IRRITABLE UTERUS.

May be defined, a permanent and painful sensibility of the uterus, especially of its neck; often accompanied by increased frequency of pulse, a dry hot skin, and generally, in protracted cases, with gastric and renal derangement. This disease commonly occurs in the middle period of life, though it is sometimes met with in early youth.

The *local symptoms* are pain in the small of the back and sacrum, extending down the thigh to the knee, and around the brim of the pelvis to the lowest part of the abdomen. There are also sometimes erratic pains in the thorax and loins. The character of the pain is that of *soreness,* slight pressure relieves it, but it is aggravated by rough handling. Sometimes it is spasmodic, like those of abortion. Dewees describes the pain as often pulsating.

The pain is aggravated by excitement of any kind, by exercise, and sometimes by standing. Straining, either in defecation or urination, constipation, flatulence, and diarrhœa, all aggravate it.

A per vaginam examination may prove the uterus to be either displaced or engorged, but not altered in form, size, or density; extremely painful to the touch, in the body as well as in the neck; the pain is "as if a knife had been plunged into it."

Causes.—Among the predisposing causes may be placed, education, fashionable life, prolonged lactation, and temperament. Among the exciting causes, bodily exertion during menstruation, astringent injections, abortions, prolapsus and sudden arrest of the menses from any cause.

Diagnosis.—From neuralgic dysmenorrhœa, by the constancy of the pain. From acute inflammation of the cervix, by the absence of heat, swelling, and throbbing; by the absence of discharges, and by the slight change of the cervix compared with the amount of suffering.

Pathology.—Gooch considers it a permanently painful condition of the uterus, neither accompanied by, nor tending to produce change in its structure. Ashwell considers it a modified inflammation, or at least, closely allied to inflammation or congestion.

Treatment.—Two indications present themselves, viz.: 1. To mitigate local suffering; 2. To sustain and improve the general health. The first indication will be fulfilled by the use of anodynes, either by the mouth, rectum, or applied directly to the uterus itself; by the application of nitrate of silver, by dilating the cervix, by bougies, and by anointing the cervix with anodyne unguents, especially the unguent. aconiti. The second indication, by rest, exercise in a recumbent posture, or, if it suits best, on foot or horseback, tonics, nutritious food, cold bath, or the douche, and cheerful society. Scarifications to the neck of the uterus are highly recommended by Dr. Ashwell, especially if there be any congestion. The introduction of the pessary is often followed by marked relief, especially if there be any descent.

DISPLACEMENTS OF THE UTERUS.

Displacements of the uterus are of three kinds, viz., *Prolapsus*, *Retroversion*, and *Anteversion*.

PROLAPSUS UTERI.

Signifies a sinking of the uterus nearly or quite down to the os externum; when it protrudes beyond the vulva it is called *procidentia uteri.* The position of the uterus has been already described. (Page 24.)

Causes.—Heaviness of the uterus itself; hence it often occurs in early pregnancy; congestion of the uterus; ovarian and other abdominal tumours; tympanitis; distension of the colon; relaxation of the ligaments, and too early "getting up" after labour; tight lacing, dancing, running, or any severe muscular exercise; leucorrhœa and other exhausting discharges, straining, coughing, &c.

Symptoms.—In some cases there is no suffering at all, or merely a sense of fulness. At others, there is pain in the back and groin, extending down the thighs to the knees or toes. The patient suffers great distress in standing or walking, and in voiding the urine and fæces. Strangury is sometimes present from the extension of the irritation to the bladder. Sometimes leucorrhœa is present, at others menorrhagia. The stomach and bowels sympathize; there is anorexia, loss of tone in both stomach and bowels, constipation or diarrhœa, and sometimes tympanitis. The patient often becomes morose and irritable. In *procidentia* the patient often suffers no other inconvenience than that arising from the external presence of the organ, or its acrid discharges.

Diagnosis.—In addition to the above symptoms, a per vaginam examination reveals the nature of the disease. The presence of the os uteri, at the lower part of the tumour felt in the vagina, is almost infallible. From prolapsus of the bladder, rectum, or vagina, it may be distinguished by their greater softness and elasticity, and by the absence of the os uteri. *Procidentia* may be distinguished from partial inversion, by the presence of the os uteri at the lower portion of the tumour; by the absence of severe floodings, and by the smooth surface of the tumour.

Treatment.—Opinions differ much on this point. Nearly all agree as to the necessity of mechanical support in most cases. The difficulty is, *as to the mode.* In slight cases, rest in a horizontal position, with cold or astringent injections, are often sufficient. In prolapsus after confinement it is particularly necessary. Bandages, when they relieve, act by supporting the abdominal muscles, and those of the back, hence they may be useful in women who have borne many children, and in whom these muscles are much relaxed. They can never be regarded as *uterine supporters.* In decided prolapsus, and almost invariably in procidentia, mechanical support by means of *pessaries* becomes necessary. These differ in shape according to the end to be obtained, and the peculiar views of the practitioner using them. The mode of introduction is as follows: The patient being placed on her side or back, the long diameter of the instrument is to be placed in accordance with the long diameter of the lower outlet; then gently introduced by steady pressure. When fairly introduced it must be partially turned so as to place it transversely across the pelvis and above the tubera ischii. The globe pessary is more easily introduced and requires no turning. In procidentia the uterus should be first returned, and then retained by means of the pessary. In addition to these means the patient should use cold injections, or hip-baths, astringent injections, rest, for a season at least, tonics, if her health be enfeebled, laxatives, if the bowels are constipated, and astringents if diarrhœa be present. It has been proposed to cure the disease by cutting out part of the vagina, or to produce cicatrices by caustic, which, by their contraction, shall support the uterus.

RETROVERSION OF THE UTERUS.

By this term is understood a tilting backwards either of the fundus alone, or of the entire uterus, so that, if the pelvis be of the full size, the fundus will be depressed below the promontory of the sacrum. This displacement is called *retroflexion*, when the fundus alone is forced backwards; *retroversion*, when the entire organ takes that position.

Causes.—It most commonly occurs in women who have borne children, or who are pregnant, and is caused by a sudden impulse backwards either by a distended bladder, by long standing, or by a sudden expulsive effort.

During the early months of pregnancy the uterus is peculiarly liable to this displacement.

Most of the instances of retroversion are attributable to a distended bladder; for, as this organ fills, it rises, and pulls the lower portion of the uterus upwards; at the same time the fundus is pushed backwards, by the repletion of the bladder; the os uteri therefore presses against the neck of the bladder and produces retention of the urine; the fundus presses against the rectum and prevents the passage of fæces, which thus accumulate above the point of pressure, and not only prohibit the ascent of the fundus to its normal position, but really force it lower. The accident may also happen from falls, shocks, lifting weights, and, according to Churchill, in the early days of menstruation, when the uterus is increased in weight by the afflux of blood. The growth of tumours in the neighbourhood of the fundus is also a cause.

The *symptoms* are violent bearing-down pains, sense of fulness and distension about the loins and hollow of the sacrum, dragging and tension in the groins, and inability to pass fæces or urine. A per vaginam examination reveals the os tincæ thrust up behind the symphysis pubis, and the vagina seems to be obstructed by a hard body, which is the fundus turned down into the hollow of the sacrum.

The *treatment* consists in emptying the bladder and rectum, and pressing up the fundus by two fingers in the rectum, assisting them, if necessary, by a finger of the other hand in the vagina, by which the os uteri can be hooked down. Venesection is sometimes necessary to relax the system. Sometimes merely emptying the bladder and rectum are sufficient, the uterus recovering itself through the muscularity of the round ligaments. Sometimes it is necessary to rupture the ovum, and let the uterus condense itself. At others, tapping the uterus is required. The after-treatment is, rest in a horizontal posture, and the avoidance of the distension of the bladder and rectum. Prof. Simpson's "*womb-sound*" has been successfully employed in restoring the organ to its normal position in cases of retroversion of the unimpregnated uterus.

ANTEVERSION OF THE UTERUS.

Anteversion is that displacement in which the uterus occupies a transverse position in the pelvis, the fundus being directed toward the symphysis pubis. *Anteflexion* is a bending of the uterus at the neck, by which the fundus is caused to approach the pubes.

Causes.—Violent expulsive efforts either during or after emptying the bladder, accumulation of fæces in the rectum, blows, falls, obstinate diarrhœa, contraction of the round ligaments, and pregnancy in the early months.

Symptoms.—Weight in the pelvis, pain in the hypogastrium and in the perinæum, sense of dragging from the loins, all increased by standing or walking. By a per vaginam examination the pelvis will be found blocked up by a tolerably dense body; the fundus uteri will be felt anteriorly, the cervix posteriorly. A sound introduced into the bladder will impinge upon the displaced fundus, which will be distinguished from stone, however, by the absence of the clicking sound.

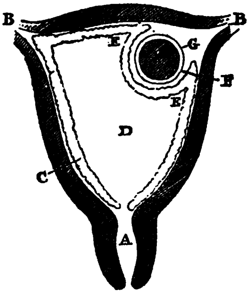
Treatment.—Many cases cure themselves by directing the patient to let the bladder fill, and to keep the rectum empty. The organ may be readily replaced, if it have not contracted adhesions, by hooking down the cervix with the forefinger of one hand, while the fundus is elevated by the other; the patient should afterwards be kept in bed on her back for some days.

Various forms of pessaries have been recommended for the treatment of these diseases, but they are rarely necessary.

GENERATION.

By this term is understood, *that function by which the species is reproduced*, and it is effected by the union of the two sexes. There are two principal theories of generation, viz.: that of *epigenesis*, in which each parent contributes a part to the developement of the new being, and that of *evolution*, in which the mother supplies all the necessary material, the male merely awakening the plastic powers resident in the female product. The popular belief is that each parent supplies material; the male, the seminal fluid; the female, the ovum; that a union of these two takes place, and from thence results the *tertium quid*, the new being. A great point of difficulty is, as to where this union takes place; some contending that it is in the ovaries, others, that it occurs in the uterus; the ovum having been previously discharged from the ovary, meeting the male sperm at that place. According to the recent observations of Mr. Coste, the ovule undergoes disintegration within ten or twelve hours after extrusion from the ovary. This would seem to confirm the doctrine of ovarian impregnation, or, at least, impregnation high up in the Fallopian tube. The only point that seems entirely settled, is the necessity of *actual contact*, mere *aura* not being sufficient to effect fecundation. The immediate result of this contact, or of successful intercourse, is the production of great excitement and vascular turgescence of the uterus, ovaries, and Fallopian tubes, which lasts for some time. After fecundation has taken place, both ovum and uterus undergo changes, the ovum developing itself by its own plastic action upon the materials it derives from the mother, at first by absorption through the villi of the chorion, and afterwards by the placenta, and the uterus increasing in size, and producing upon its interior face a membrane called the *caducous*, or *deciduous*, the formation of which has been variously explained. According to Dr. W. Hunter, the whole interior of the uterus becomes coated with a pulpy fluid, which covers over the cervix and Fallopian tubes; this becomes hard, and resembles coagulated lymph, and is called the *decidua vera*. As the ovum now descends the Fallopian tubes on its way to the uterus, it comes in contact with this membrane at the orifice of the Fallopian tubes, and pushes it before it, at the same time that it is reflected over itself, thus forming the *decidua reflexa*. (Fig. 11.) It appears, however, from the late researches of Dr. Sharpey and Professor Weber, that the decidua is really composed of the inner portion of the mucous membrane of the uterus itself, which undergoes a considerable change in its character. Dr. Reid has described a tubular structure on the free surface of the uterus, which becomes thickened and increased in vascularity within a short time after conception; and when the inner surface of a newly-impregnated uterus is examined with a low magnifying power, the orifices of its tubes are very distinctly seen, being lined with a white epithelium. This is perhaps the more correct view, since the decidua reflexa is found to be different in its structure from that of the decidua vera, which would not be, were they formed as described by Hunter. When an ovum has been thus fecundated, and brought to maturity in the uterus, before extrusion, it is called *viviparous generation*. This is the variety which occurs in the human female.

Fig. 11.*



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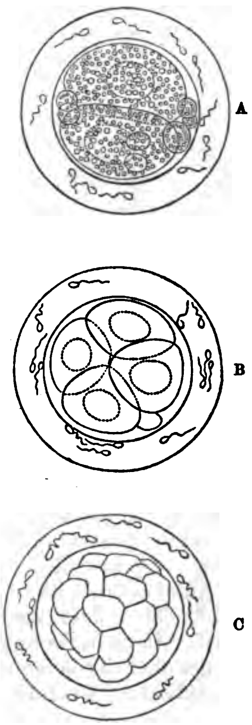
* A, neck of womb; B, orifice of left Fallopian tube; C, decidua vera; D, cavity of the womb; E, E, decidua reflexa; G, ovum; F, chorion.

DEVELOPMENT OF THE FŒTUS.

It has already been stated that, after impregnation, the ovum developes itself by its own plastic power, out of the materials supplied to it by the mother. It will be remembered that it was originally contained within the Graafian vesicle, and that it contains a yolk similar to that seen in the hen's egg, although much smaller, in the centre of which is found the germinal vesicle, on whose walls is the germinal spot or nucleus, from which all the various parts of the new being are developed. According to some physiologists, impregnation takes place in the ovary, and before the rupture of the Graafian vesicle; according to others, the Graafian vesicle is ruptured first, the ovum escapes into the Fallopian tubes and meets the male sperm on its way to the uterus. The first change which can be discovered after fecundation and consequent upon it, is the *cleavage* of the yolk, which resolves itself first into two, then into four, then into eight segments (Fig. 12, A, B, C), each segment containing a transparent vesicle, probably a descendant of the original cell germ. By a continuance of this process the whole cavity of the yolk membrane becomes filled with a collection of cells which, from its mulberry-like appearance, is called the germinal or mulberry mass. An envelope is now formed around each of the component segments of the yolk, converting it into a vesicle, of which the contained particle is the nucleus. This happens first to the peripheral portions of the mass, which arrange themselves at the surface of the yolk into a membrane, which, becoming thicker by the addition of new cells from the interior, forms what is called the "*germinal membrane;*" and as this forms a complete sac surrounding the liquid yolk, and as the whole structure of the future embryo originates in its substance, it has been called the *blastodermic vesicle.* On one portion of this vesicle a number of cells accumulate,

Fig. 12.*



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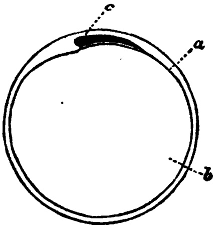
* Progressive stages in the segmentation of the vitellus of the *Mammalian Ovum*:—A, its first division into two halves; B, subdivision of each half into two; C, further subdivision, producing numerous segments.

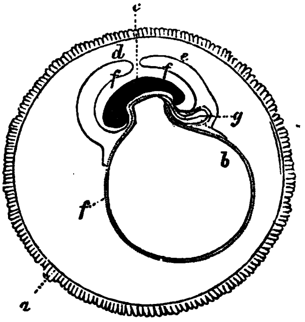
Fig. 13.*



constituting what is called the *area germinativa* (Fig. 13 *c*), in which all the structures of the permanent organism originate, whilst the germinal membrane itself subdivides into two layers, an inner *mucous* and an outer *serous*, between which is subsequently developed the *vascular* layer. The external layer becomes the integument; the middle, the vascular system; and the internal, the digestive apparatus.

The Amnion.—The outer or serous layer of the germinal membrane at the point where the embryo is developing itself, rises up on each side of it in two folds, forming the inner membrane of the ovum, which is called the amnion. These two folds gradually approach each other till actual contact takes place, in the space between the general envelope and the embryo, so as to form an additional investment to the latter. As each fold contains two layers of membrane, a double envelope is thus formed, of which the outer layer (Fig. 14, *d*, *e*) afterwards adheres to the inner surface of the chorion; whilst the inner one (Fig. 14, *f*, *f*) remains as a distinct sac, to which the name *amnion* is given.

Fig. 14.†



"The membrane thus formed embraces the embryo very closely at an early period, and is continuous with the common integument of the fœtus, at the open abdominal parietes. At a later period it is distended with fluid, and so separated from the fœtus, and after being reflected upon the funis, of which it forms the outer coat, it terminates at the umbilicus. It is thin and transparent, but of a firm texture, resisting laceration much more than the other membranes. Its extended surface is somewhat flocculent, but internally it is quite smooth, like serous membrane, and like it secretes a bland fluid." This fluid resembles dilute serum, and is called *liquor amnii*. It varies in amount from half a pint to several quarts, the average quantity being about half a pound.

It subserves several useful ends. It probably serves as a nutriment to the fœtus during the early months; it preserves an equable temperature for it while remaining in utero, it protects it from the effects of sudden blows, shocks, &c. It is also useful in dilating the os uteri, by protruding the membranes in the commencement of labour.

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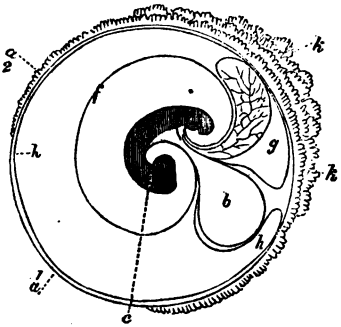
* Plan of early *Uterine Ovum*. Within the external ring, or zona pellucida, are the blastodermic vesicle, *a*; the yolk, *b*; and the incipient embryo *c*.

† *a*, chorion; *b*, umbilical vesicle, surrounded by the serous and vascular laminæ; *c*, embryo; *d*, *e*, and *f*, external and internal folds of the serous layer, forming the amnion; *g*, incipient allantois.

The *Umbilical Vesicle* is formed by the doubling in of the mucous layer under the abdomen of the fœtus, so as to enclose a cavity containing the yolk, which communicates with the digestive tract. (Figs. 13, 14, *b*.) Upon the yolk the embryo subsists as long as it lasts, the umbilical vesicle becoming smaller and smaller as it is absorbed, until finally only a narrow orifice remains, which ultimately closes up and the umbilical vesicle is thrown off; it may, however, be detected upon the umbilical cord up to a late period of pregnancy.

The Allantois.—After the yolk has been entirely absorbed, it becomes necessary that the fœtus should have some other means of support, and the following are supplied. From the inferior or caudal extremity of the fœtus there arises, at the point where the urinary bladder is afterwards seated, a delicate membranous sac, which is formed from the mucous layer, and has distributed upon its surface, a number of minute blood-vessels, from the vascular layer; this vesicle gradually extends itself between the amnion and the chorion, until it comes in contact with that portion of the uterine surface, where the villi of the chorion are most abundant; here the vessels which it carries attach themselves, in order to form the placenta, and the allantois having fulfilled its function shrivels up, although traces of it may be found in the cord. In its development the

Fig. 15.*



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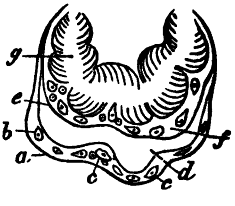
* Diagram representing a Human Ovum in second month; *a*, 1, smooth portion of the chorion; *a*, 2, villous portion of chorion; *k*, *k*, elongated villi, beginning to collect into placenta; *b*, yolk-sac or umbilical vesicle; *c*, embryo; *f*, amnion (inner layer); *g*, allantois; *h*, outer layer of amnion, coalescing with chorion.

allantois passes out of the anterior part of the abdominal cavity, in the region of the umbilicus, which at this time is open. As the cavity is closing, by the gradual development of its walls towards the median line, it is separated into two portions, which communicate; that part which is within the body, forms the urinary bladder, with its urachus or tube of communication. (Fig. 15.)

The Chorion.—The outer membrane of the ovum is called the chorion, and is formed during its passage through the Fallopian tube, by receiving an additional layer of albuminous matter secreted from the walls of the tube, and this is surrounded by a fibrous membrane. This new formation is one of great importance, as it is through this the whole subsequent nutrition of the embryo is derived; this is accomplished at first by means of a number of villous processes, which proceed from the whole surface of the chorion, and give it a rough, shaggy appearance; these villous processes serve as absorbing radicles, drawing in the fluids supplied by the mother, until a more perfect communication is afforded by the placenta. As the ovum advances in age, these villi diminish in number, assume a vesicular appearance, and finally disappear altogether, except at that part of the chorion which is in contact with the uterus, and where the placenta is subsequently formed. In some animals, this connexion between the villous coat of the chorion and the uterine surface is the only one that exists, hence they are called *non-placental.*

The Placenta.—The formation of this organ commences by the penetration of the villi of the chorion into the tubuli of the decidua, already described; later we find a vascular connexion established between them and the villi, by the agency of the allantois, in the manner abovementioned, the allantois conveying the blood-vessels of the fœtus to that portion of the chorion. It must not, however, be understood, that there is any direct communication between the vessels of the fœtus and those of the mother, the fœtal tufts being merely *bathed* in the maternal blood and drawing nourishment from it by its own cells, which have the power of selecting, and of elaborating their own materials. The fœtal portion of the placenta consists of the branches of the umbilical vessels, which divide minutely where they enter the organ, and constitute by their ramifications a large portion of its substance, each subdivision terminating in a villus. Each villus contains a capillary vessel, which forms a series of loops, communicating with an artery on one side and with a vein on the other. The vessels of the villi are covered by a layer of cells enclosed in basement membrane (Fig. 16). The maternal portion may be considered as a large sac, consisting of a prolongation of the internal coat of the great uterine vessels. Against the fœtal surface of this sac the placental tufts push themselves, dipping down into it and carrying before them a portion of its thin wall, so as to constitute a sheath to each tuft. The blood is conveyed into the cavity of the

Fig. 16.*



placenta by the "*curling arteries*," so named from their tortuous course, which proceed from the arteries of the uterus; and the blood is returned through large uterine veins, called *sinuses*. The placenta performs the twofold office of an absorbing and respiratory organ; it begins to be formed about the end of the second month, acquires its peculiar character during the third, and goes on increasing in proportion to the development of the ovum. At full term its diameter is about six or eight inches, its circumference eighteen to twenty-four, and its thickness from one inch to an inch and a half. Its internal or fœtal surface is smooth and shining, being covered by the chorion and amnion; the outer, or uterine surface, is level but not so smooth, being divided by numerous sulci between the lobules of which it is composed.

The umbilical cord, called also the *funis*, or *navel-string*, is the means of communication between the fœtus and placenta. It usually arises from the centre of the placenta, though sometimes from the edge, forming the *battledore placenta*. It consists of two umbilical arteries, and one umbilical vein; besides these it contains the duct of the umbilical vesicle, the omphalo-mesenteric vessels, the urachus, and sometimes more or less of the intestinal canal, the whole imbedded in the Whartonian jelly, and invested by a reflection from the amnion. The length varies much; the average, however, is about eighteen inches. Sometimes it is so short as seriously to impede the progress of the labour.

To return now to the development of the embryo, the account of which is condensed from the Elements of Physiology, by Dr. Carpenter.

The parts first formed are those which most clearly distinguish the vertebrated animals from all others, viz., the vertebral column and spinal cord. These first make their appearance in the situation of the cluster of cells known as the *area germinativa*, and are included under the name of *chorda dorsalis*, which is found to be composed, wherever it exists, of nucleated cells. From cells exterior to this, is developed the vertebral column. Concurrently with this development, appears the vascular system, which is first seen in the middle layer of the germinal membrane, called the *vascular*. Vessels are formed here which serve to take up the nutriment supplied by the yolk, and carry it to the tissues of the embryo. These vessels are first seen in that part of the vascular lamina of the germinal membrane which immediately surrounds the embryo, and they form a delicate network of vessels called the *vascular area;* this gradually extends itself till the vessels spread over the whole of the germinal membrane, and it is through their agency that the nutritious matter of the yolk is conveyed to the embryo. The vessels of the yolk-bag terminate in two large trunks, called omphalo-mesenteric, meseraic, or vitelline vessels, which enter the embryo at the point which afterwards is known as the umbilicus. The first movement of fluid takes place *towards* the embryo, and may be discovered before any heart is seen. The heart is formed in the substance of the vascular layer, by a dilatation of the trunk, into which the blood-vessels unite. It is at first a mere excavation, but afterwards its walls become more developed, and it is divided into cavities. Along with the development of the vascular apparatus, appears also the permanent digestive cavity; this originates in the separation of a small portion of the yolk-bag lying immediately beneath the embryo, by a doubling in of the mucous layer, so as to enclose a cavity. This, by subsequent prolongation and involution of its walls, is rendered more complex, so as to form a stomach and intestinal tube. The digestive cavity communicates for some time with the yolk-bag (from which it has thus been pinched off) by the opening that is left by the imperfect meeting of the folds of the germinal membrane that forms its walls. In the mammalia, this orifice is gradually narrowed, and at last completely closed; and the yolk-bag thus separated is afterwards thrown off; it is then known as the *umbilical vesicle,* and may be seen upon the umbilical cord up to a late period of pregnancy.

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* Extremity of a placental villus:—*a*, external membrane of the villus, continuous with the lining membrane of the vascular system of the mother; *b*, external cells of the villus, belonging to the placental decidua; *c*, *c*, germinal centres of the external cells; *d*, the space between the maternal and fœtal portions of the villus; *e*, the internal membrane of the villus, continuous with the external membrane of the chorion; *f*, the internal cells of the villus, belonging to the chorion; *g*, the loop of umbilical vessels.

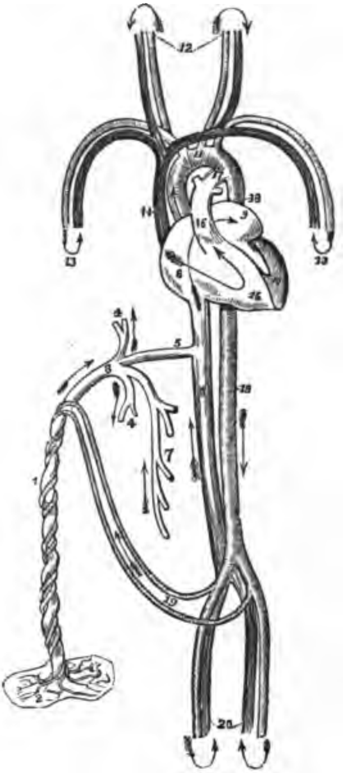
At first the body of the embryo is more elongated than afterwards, and the trunk is the first part developed, at the upper extremity of which is a small prominence less thick than the rest, and separated by an indentation, which distinguishes the head. No traces of extremities can yet be discovered, or of any other prominent parts. It is straight, or nearly so, the posterior part being slightly convex, the anterior concave.

Afterwards the head becomes more rapidly developed, so that at the beginning of the second month, it nearly equals the half of the whole body. In the fifth week, the extremities become visible, the upper generally appearing first, in the form of small blunt prominences. As they develope themselves, the distant points appear first, that is, first the hands, which seem to be fixed to the shoulders, then the fore-arm, then the arm. The same is true of the lower extremities. The external organs of generation appear after the development of the extremities, as also do the nose, ears, and mouth. Ossification commences in the base of the cranium, and the bones under the scalp are those in which the process is last completed. The length of a full-grown fœtus is about eighteen inches, the weight between six and eight pounds as the average.

Fœtal circulation.—The peculiarities of the fœtal circulation, in which it differs from that function in the adult are, 1st. The *ductus venosus*, a supplementary vein, situated at the thick edge of the liver, and leading from the umbilical vein to the vena cava ascendens. 2d. The aperture between the right and left auricle, effecting a communication between them, called the *foramen ovale.* 3d. The *ductus arteriosus*, a branch given off from the pulmonary artery soon after its origin, which conducts the venous blood that has arrived at the heart from the head into the aorta just below its arch.

The following is the route of the circulation in the fœtus, starting from the placenta. The blood, after being aerated in this organ, is collected by the *umbilical vein*, which carries it to the umbilicus of the child. After entering the cavity of the abdomen, the current divides,

Fig. 17.*



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* The fœtal circulation: 1, the umbilical cord, consisting of the umbilical vein and two umbilical arteries; proceeding from the placenta (2); 3, the umbilical vein dividing into three branches; two (4, 4) to be distributed to the liver; and one (5) the ductus venosus, which enters the inferior vena cava (6); 7, the portal vein, returning the blood from the intestines, and uniting with the right hepatic branch; 8, the right auricle; the course of the blood is denoted by the arrow, proceeding from 8 to 9, the left auricle; 10, the left ventricle, the blood following the arrow to the arch of the aorta (11), to be distributed through the branches given off by the arch to the head and upper extremities. The arrows, 12 and 13, represent the return of the blood from the head and upper extremities through the jugular and subclavian veins, to the superior vena cava (14), to the right auricle (8), and in the course of the arrow through the right ventricle (15), to the pulmonary artery (16); 17, the ductus arteriosus, which appears to be a proper continuation of the pulmonary artery—the offsets at each side are the right and left pulmonary artery cut off; these are of extremely small size as compared with the ductus arteriosus. The ductus arteriosus joins the descending aorta (18, 18), which divides into the common iliacs, and these into the internal iliacs, which become the umbilical arteries (19), and return the blood along the umbilical cord to the placenta; while the other divisions, the external iliacs (20), are continued into the lower extremities. The arrows at the termination of these vessels mark the return of the venous blood by the veins to the inferior cava.

part of it being sent through the venæ portarum to the liver; the remainder reaches the vena cava ascendens through the *ductus venosus*, where it is mixed with the blood from the inferior extremities. The blood that was sent to the liver is collected by the hepatic veins and also emptied into the *vena cava* ascendens, which finally discharges its contents into the right auricle of the heart. From the *right* auricle, it is directed by the Eustachian valve through the *foramen ovale*, into the *left* auricle, thence it passes into the left ventricle, by which it is distributed through the aorta to the system, a large proportion of it going to the head and upper extremities. The latter blood (that from the head, &c.), is collected by the vena cava descendens, and emptied also into the *right* auricle, from whence it passes into the *right ventricle*, from thence mainly through the *ductus arteriosus* into the aorta, a small portion only passing into the pulmonary artery. From this it will be seen that the liver is the only organ that receives the blood from the placenta *unmixed*. Every other organ receiving mixed arterial and venous.

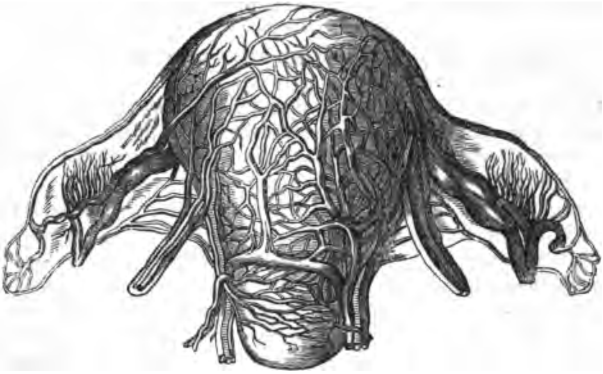
After birth, the current is entirely changed by the establishment of respiration, and its diversion into the lungs. The ductus venosus and the ductus arteriosus shrivel up into ligamentous cords; the foramen ovale shortly closes by the apposition of its valve; the pulmonary artery and vein become dilated to receive the increased current, and the circulation, which before resembled that of the higher reptiles, becomes now that of the perfect mammal. It not unfrequently happens, however, that some arrest of development takes place, and prevents the completion of these changes; various malformations hence result, involving an imperfect discharge of the function.

It will be borne in mind by the student, that there is, in the fœtal circulation, a deviation from the normal function in several of the vessels. The umbilical vein and ductus venosus carry *arterial* blood; while the umbilical arteries and ductus arteriosus carry *venous* blood (Fig. 17).

PREGNANCY, ITS PHENOMENA AND DISEASES.

Before entering upon the consideration of the signs by which a woman knows herself to be pregnant, it will be proper to examine what further changes take place in the uterus itself. It has already been stated that the uterus becomes more vascular, after conception has taken place, and that its interior lining becomes altered; the vessels, arteries, veins, and lymphatics are increased in size, and it has been said by Dr. Robert Lee, that the nerves are also increased in numbers, although this latter change is doubted by many. The proper tissue of the uterus also undergoes great changes. In proportion as the ovum is developed, the fibres are separated from each other, and increased in number, leaving spaces between them which are filled by the enlarging vessels (Fig. 18). That the amount of substance is absolutely increased, is shown by the difference of weight between a virgin uterus, and one at full term, just emptied; the former weighing one ounce, the latter nearly twenty-four. The increase in the development of the womb is not uniform from the first, but commences at the fundus, gradually extending to the body, and last of all, about the fifth month, to the cervix. Up to the fourth month the uterus is generally retained entirely within the pelvis; shortly after this, its fundus may be felt above the symphysis pubis in thin persons; about the fifth month it reaches midway between the pubes and umbilicus, gradually ascending till the eighth month, when it is as high as the ensiform cartilage. After this, although it increases in capacity, it no longer ascends; on the contrary it rather falls. Its capacity is also greatly increased: according to Levret's calculations, its superficies may be estimated at 339 inches, and its cavity will contain 408 inches; its length being from 12 to 14 inches, its breadth from 9 to 10, and its depth from front to rear, 8 to 9 inches. The weight of the whole organ, and its contents, at full term, is about twelve pounds. The *form* of the gravid uterus differs also from that of the unimpregnated state, and this difference appears to depend in a great measure upon its increase in size, and the form of the cavities it occupies. In the non-gravid state, when it occupies the cavity of the pelvis, its anterior surface, corresponding to the bladder, is flattened, while its posterior aspect is convex. The reverse, however, obtains during the latter half of pregnancy. The anterior surface is

Fig. 18.



now *convex*, being merely covered by the yielding anterior wall of the abdomen; whilst posteriorly the uterus is nearly concave, corresponding to the prominence of the lumbar vertebræ. This condition of things may be readily ascertained by examining the abdomen of a pregnant female in the last months of gestation, whilst she is lying down.

The situation and position of the uterus are also changed: in the non-gravid state, the fundus inclines somewhat backwards, the os uteri being nearly in the centre of the pelvic cavity; the gravid uterus, during the latter half of pregnancy, has its fundus inclined forwards, and the os uteri directed backwards towards the upper part of the hollow of the sacrum.

During the first month, the changes are not very appreciable, the uterus is larger, softer, and more vascular, the *os* and *cervix* are soft, and cushiony, as during the menstrual period, and the transverse fissure is more *oval.*

During the second month, abdomen somewhat flat, cervix increased in size, and the os uteri can be felt lower than natural; its shape also is changed, being round and smooth in primiparæ, while in multiparæ it is larger and irregular in shape. The canal of the cervix is closed by a gelatinous plug.

During the third month, slight protrusion of the abdomen, os uteri not so easily reached, and somewhat changed in position; it is no longer in the middle of the pelvic cavity, but inclines towards the hollow of the sacrum, while the fundus approaches more nearly to the anterior parietes of the abdomen.

During the fourth month, the fundus may be discovered two or three inches above the symphysis pubis in thin persons by pressure, having first relaxed the abdominal parietes, and emptied the bladder and rectum.

During the fifth month, the cervix is drawn out by the expanding uterus and shortened, and the fundus may be felt halfway between the symphysis pubis and umbilicus.

During the sixth month, the cervix has lost very nearly one-half its length, the fundus is as high as the umbilicus, and the navel depression begins to disappear.

During the seventh month, the cervix is only half its original length; the fundus rises a little above the umbilicus, which often becomes pouting. The head may also be felt per vaginam by ballottement, and the movements of the child detected through the abdominal walls.

During the eighth month, the cervix is not more than a quarter of an inch long, abdomen increased considerably in size, and the os uteri so high as scarcely to be reached. The fundus is about midway between the umbilicus and scrobiculus cordis.

During the ninth month, the neck is obliterated, so that upon making an examination, we find the vagina closed superiorly by the rounded lower end of the uterus, and in primiparæ the fundus is at the scrobiculus cordis. During the last few weeks of pregnancy the fundus sinks a little, the abdomen falls, the os uteri appears only as a little dimple, and its edges are thin and membranous; it occupies now the upper part of the hollow of the sacrum. In women who have borne many children the cervix does not entirely disappear.

SIGNS OF PREGNANCY.

These are divided into the *rational* and *sensible*, the latter of which only can be depended upon, as the former may occur in abnormal conditions of the uterus, independent of pregnancy. The rational signs occur in the earlier months; the sensible or physical, after the ovum is somewhat developed. The diagnosis is at all times difficult in the early periods.

Rational signs.—Plethoric condition and fibrinous blood; variations in temper and taste; altered functions of stomach, bowels and kidneys; change in the colour of the skin; *cessation of the menses*, though not invariable, is one of the earliest signs; *morning sickness*, from the sympathy between the uterus and stomach; *salivation*, not to be confounded with mercurial ptyalism, from which it may be distinguished by the absence of sponginess of the gums, and the peculiar fetor; *enlarged* and *painful mammæ*, and in many cases a *darkened areola* and enlargement of the follicles situated in it, with a soft and moist state of the integuments; *milk in the breast;* this fluid is sometimes found in the breasts during the latter stages of gestation, but is not invariable, nor always to be depended on when present. *Quickening;* this sensation has been variously described, some authors say it is caused by the first movements of the child; others assert that it is caused by the sudden rise of the uterus from the pelvis into the abdominal cavity, producing fainting, sickness, &c. As a sign of pregnancy it is almost valueless, since females are very apt to be deceived in this respect by the movements of flatus in the bowels, by occasional spasmodic twitching of the abdominal muscles, &c.

Kiesteine.—During pregnancy a peculiar substance, analogous to caseine, is found in the urine, forming a thin pellicle upon its surface when it is allowed to stand, which emits an odour resembling cheese. It is not, however, peculiar to pregnancy, but may occur whenever the lacteal elements are not eliminated by the mammary glands. At the same time the probabilities are as 20 to 1, that the female is pregnant, if the kiesteine be present.

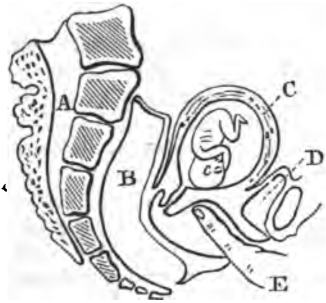
Blue colour of the vagina has also been looked upon by M. Jacquemier, and M. Parent Duchatelet, as among the rational signs of pregnancy.

The SENSIBLE OR PHYSICAL SIGNS OF PREGNANCY, are those by which the presence of a fœtus in utero are detected by an exploration of the organ itself.

Enlargement of the abdomen, begins to be perceptible about the end of the second month; before this the abdomen is often flatter than usual. "A ventre plat, enfant y'a."

Ballottement, is practised thus: The patient should be in the *upright position*, or at least in a semi-recumbent posture: now let the operator place the left hand upon the fundus uteri to steady it, and introduce the index finger of the right hand to the cervix uteri, then suddenly but gently jerking the finger upwards, he will feel a sensation as if something had receded from it, and then settled down upon it again. This test is most available about the fifth and sixth months. (Fig. 19.)

Fig. 19.*



Auscultation was applied to the detection of the presence of a *fœtus* in utero, first by M. Mayor, of Geneva. Three sounds have been heard by different observers, viz.: that of the fœtal heart, that of the placental circulation, and that of the pulsation in the cord. The first of these is the most certain; the second may be imitated by the pressure of a tumour upon any great vessel, and the last can only be heard under very favourable circumstances, as where the cord lies between the child and the abdomen of the mother. The situation in which the fœtal heart is most distinctly heard, is about the middle point between the scrobiculus cordis and symphysis pubis, generally to the left. The frequency of the pulsation is about double that of the adult, ranging from 120 to 140 per minute, and entirely independent of the maternal circulation. The sound resembles very much the ticking of a watch under a pillow. In breech presentations it is usually heard a little higher.

This is a most valuable diagnostic sign, and if once heard, unequivocally, the real nature of the case is established beyond doubt.

The *placental souffle* may usually be detected by the stethoscope low on the sides of the abdomen, after the fourth month; it is a peculiar blowing sound, corresponding to the pulse of the mother.

The *movements of the child* may frequently be detected by placing a cold hand on the abdomen of the mother, after the sixth month, but this is not a certain sign, as above stated, since it may be imitated by movements of flatus, &c.

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* A, vertical section of sacrum; B, rectum; C, uterus and ovum; D, bladder; E, finger in the vagina with its extremity pressing up the uterus.

The following *resumé* of the signs of pregnancy is taken from the "Elements of the Principles and Practice of Midwifery," by Prof. Tucker:—

DURING THE FIRST AND SECOND MONTHS.

RATIONAL SIGNS.

1. Suppression of the catamenial discharge.
2. Nausea, vomiting, ptyalism, anorexia, &c.
3. Unnatural flatness over the hypogastrium.
4. Tumefaction and tenderness of the mammæ.

SENSIBLE SIGNS.

1. Increase in the size and weight of the uterus.
2. Slight prolapsus of the uterus.
3. Diminished mobility of the uterus.
4. The cervix uteri is directed towards the symphysis pubis.
5. The os uteri, round and regular in primiparæ, but in multiparæ, irregular in its circumference and more or less open.
6. Ramollissement of the mucous membrane, covering the cervix uteri. The fibres of the neck not yet softened.

DURING THE THIRD AND FOURTH MONTHS.

1. Suppression of the catamenia.
2. Continuance of nausea, vomiting, anorexia, ptyalism.
3. Slight prominence over hypogastrium.
4. Depression of the umbilicus.
5. Tumefaction of the breasts increased, with increase in the prominence of the nipple, and a slight discoloration of the areola.
6. Kiesteine in the urine.

1. The fundus uteri elevated rather above the pelvic brim, at the end of the third month. At the termination of the fourth month, it rises two inches above the pubis.
2. Fulness and dulness over the hypogastrium.
3. Existence of a small tumour in hypogastric region.
4. The direction of the long diameter of the uterus is now changed, so as to correspond with the axis of the pelvic brim. The os uteri is considerably elevated in the excavation.
5. Ramollissement of the inferior portion of the cervix is more marked; os uteri more open in the multiparæ, but still closed in those who have not borne children.

DURING THE FIFTH AND SIXTH MONTHS.

1. Suppression of the catamenia.
2. Cessation of nausea, vomiting, &c., now usually takes place, though they may continue throughout pregnancy.

1. At the end of the fifth month, the fundus uteri is within an inch of the umbilicus.
2. Movement of the fœtus is now active.

RATIONAL SIGNS.	SENSIBLE SIGNS.
3. Increased prominence of the umbilical region.	3. The bruit de souffle and the fœtal pulsations may now be distinguished.
4. The size of the abdominal tumour is increased, it is round, elastic, and if the abdominal walls be thin, the inequalities of the fœtus may be felt.	4. Ballottement.
5. The umbilical region more full.	5. Between the cervix and the pubis a tumour may now be felt, either soft and fluctuating, or round and hard.
6. Discoloration of the areolæ more marked, with an enlargement of the subcutaneous glands.	6. Ramollissement of one half of the cervix uteri.
7. Kiesteine in the urine.	7. In the primiparæ, the os uteri is still closed, but in the multiparæ; it is sufficiently open to admit the half of the first phalangeal bone.

DURING THE SEVENTH AND EIGHTH MONTHS.

1. Suppression of the catamenia.	1. Increase in the size of the abdomen.
2. Nausea, vomiting, &c., ordinarily absent.	2. The fundus uteri, at the end of the seventh month, has risen two and a half inches above the umbilicus ; at the eighth, it is placed within the epigastric region.
3. Abdominal tumour much increased in size.	3. Active movements of the fœtus.
4. Pouting of the navel.	4. The fœtal pulsations and the bruit de souffle still continue.
5. Increased discoloration of the areolæ, with enlargement of the sebaceous follicles, and increased prominence of the nipple.	5. Ballottement perfectly felt during the seventh month, becomes obscure in the subsequent months of pregnancy, on account of the increase in the size of the fœtus.
6. The milk may now be pressed from the swollen mammæ.	6. The ramollissement of the cervix is more extensive, and at the end of the eighth month is nearly complete.
7. Kiesteine still exists in the urine.	7. In the primiparæ, the cervix is ovoid and somewhat shortened ; the os uteri is still closed.
	8. In the multiparæ, the os uteri is wide enough open to admit the whole of the first phalangeal bone ; the upper orifice is firmly closed.

DURING THE FIRST HALF OF THE NINTH MONTH.

1. Reappearance of vomiting, not from nausea, but from pressure of the gravid uterus against the stomach.	1. The fundus uteri occupies the epigastric region.
2. The abdominal tumour is increased in size.	2. The movements of the fœtus ; the pulsation of the fœtal heart are still present. At this time, ballottement has disappeared.
3. Respiration difficult.	3. The whole cervix uteri is soft-

RATIONAL SIGNS.	SENSIBLE SIGNS.
4. All the other symptoms are augmented in intensity.	ened, except the internal orifice, which remains firm and closed. The os uteri in primiparæ is slightly opened, though not sufficiently to admit the finger, as is the case in multiparæ.

DURING THE LAST HALF OF THE NINTH MONTH.

1. The vomiting ceases, as the abdominal tumour sinks from the epigastrium.	1. The fundus uteri has sunk lower down in the abdomen.
2. Respiration less oppressed.	2. The sensible signs still persist, except ballottement, which is usually, though not always, absent after the fœtus has acquired considerable size.
3. Considerable difficulty exists in walking, owing to the sinking of the presenting part into the pelvic excavation.	3. In multiparæ, the internal orifice of the cervix is softened and dilated so that the membranes may be felt. In the primiparæ, the internal orifice is soft and dilated, but the external remains partially closed. During the last ten or twelve days, owing to the dilatation of the internal orifice of the cervix uteri, the whole cervix becomes enlarged, so as to increase the size of the uterine cavity; so that *in touching*, the finger reaches the membranes, in the primiparæ, after having passed the thin and even margin of the os uteri, while in the multiparæ, the external orifice of the cervix is thick and unequal.
4. Constant desire to evacuate the bladder and rectum.	
5. The hemorrhoids, the œdema of the limbs, and the varicose condition of the veins of the inferior extremities, are all increased.	

Duration of Pregnancy.—On this subject very little can be positively said, the *average* duration being about ten lunar months, or 280 days. There can be no doubt that many females fall short of this computation, as well as that there are many who go beyoud it. Many well-authenticated instances are on record, under the authority of Drs. Merriman, Blundell, Montgomery, Dewees, Meigs, and others, where both these deviations have occurred. The same is true of the lower animals. Dr. Rigby supposes that the duration of pregnancy is much influenced by the time in the intermenstrual period at which conception took place; that there is at every menstrual period an irritability about the uterus, even when gravid, which disposes it to take on contraction. Hence, when impregnation has occurred immediately after an appearance of the menses, the uterus will have attained such a dilatation and weight of contents by the time that the ninth period has arrived, that it will not be able to pass through this state of catamenial excitement without contracting, or in other words, labour coming on: hence it is that we find a considerable number of labours fall short of the usual time, so much so, that some authors have even considered the natural term of human gestation to be 273 days, or 39 weeks.

If, on the other hand, impregnation has occurred just before a menstrual period, the uterus may not have attained such a development as to prevent its passing the ninth period without expelling its contents, but may even go on to the next without this process taking place. Under this view of the subject, he further remarks, "the duration of time between each menstrual period should also be taken into account, some women menstruating at very short, others at very long intervals; but although this will affect the number of periods during which the pregnancy will last, it will not influence the actual duration of time, as this will more immediately depend upon the size and weight of contents which the uterus has attained."

The method of calculation is, to compute from a fortnight after the last appearance of the menses, and the period so fixed is usually corrected by the time at which quickening occurs, the latter occurrence usually taking place at four months and a half.

Extra-uterine Pregnancy.—It occasionally happens that the ovum, instead of passing down the Fallopian tube to the uterus, is arrested in its progress, and an effort is made at the point of obstruction to afford space and nutrition for the fœtus. When the ovum is detained and developed in the ovary, it is called *ovarian pregnancy*. Of this variety Dr. Granville relates a case in the London Phil. Transactions, Part 1, 1820. When the Fallopian tube is the seat of the arrest, it is called *tubal pregnancy*; of this variety cases are reported by Dr. R. Lee, in the Lond. Med. Gaz., vol. xxvi., p. 436. Also by Dr. Meigs, *vide* his work, p. 227. It sometimes happens that the ovum enters the parietes of the uterus, constituting a third and rare description called *interstitial pregnancy*. A fourth variety is called *ventral* or *abdominal pregnancy*, where the ovum falls into the abdominal cavity, attaches itself, and is developed there. It is worthy of remark, that in all these varieties, the uterus is lined with a deciduous membrane, as it is in *intra-uterine pregnancy*.

The causes are not well known, and the treatment can be merely palliative. Portions of the fœtus are often discharged from fistulous openings in the abdomen, vagina, or rectum.

PREMATURE EXPULSION OF THE FŒTUS.

The uterus sometimes expels its contents before the full period of utero-gestation is accomplished. This may occur at any time during gestation, though it appears to be more easily excited at, or previous to, the third month, owing to the frailty of the connexion between the ovum and the decidua. It is also more liable to occur at the commencement of each menstrual return, than in the interval, owing to the increased excitement of the gestative organs at that time. It is called *abortion* when the fœtus is expelled before it is capable of maintaining an independent existence, that is, before the *seventh month*. It does sometimes happen that a fœtus lives when expelled before this time, but such cases are rare. The child is hardly considered "*viable*" before this time.

Premature labour signifies the expulsion of the ovum before the full term of pregnancy has expired, but after the *seventh month*; in other words, after the child has become viable.

Causes.—These are infinitely various and numerous, and include almost every agency capable of acting injuriously on the mother, and through her on the fœtus. Mental emotions, fright, anger, joy, or sorrow when excessive, intense pain, shocks, blows, falls, great fatigue, deficient nourishment, debilitating evacuations, acute and chronic disease, the exanthemata, syphilis, and the habits of life, either extreme, being capable of producing it. To these we may add a peculiar constitutional irritability of some females, by which they abort *habitually*.

Premature expulsion is sometimes produced by circumstances which compromise the life of the child. Thus, certain pathological conditions of the amnion, chorion or decidua, malformations of the placenta, or erroneous insertion of the cord. Or it may occur from the administration of drugs exhibited for the purpose, or otherwise, such as ergot, savine, &c.

The manner in which these causes act, is either by destroying the child's life, in which method syncope, syphilis, and mercurial salivation seem to act; or by causing the womb to contract; or by partial separation of the placenta, causing the effusion of blood between that organ and the womb, and finally its entire separation, thus arresting the nutrition and respiration of the fœtus, and producing its death.

Symptoms.—The patient who is about to miscarry, generally experiences a sense of uneasiness, languor, pain in the back and lower part of the abdomen, accompanied by pains of an expulsive character, and often with hemorrhage. When the ovum itself is ruptured, there is a discharge of water from the vagina, greater or less, according to the age of the fœtus, followed afterwards by pain and discharge of blood.

Sometimes the ovum is discharged with little or no pain, at others the pains are described as being more severe than those of labour at the full term.

Treatment.—There are two points to be observed in the treatment of these accidents: *first*, If possible, to prevent the expulsion of the fœtus, and enable the woman to complete her pregnancy;

secondly, Where this is hopeless, to shorten the process as much as possible, and prevent further hemorrhage.

As we cannot be certain in the first instance, whether the child is dead, or not, it behooves us to act under the supposition of its life, knowing that if the vital relation between the ovum and the uterus is compromised it will be discharged.

The *preventive treatment* will consist in moderate bloodletting, if the patient be plethoric and the pulse full and bounding, rest in a strictly horizontal posture, on a hard bed, lightly covered with clothes, and in a cool room, cold wet napkins to the vulva, abstinence from stimulants, anodyne enemata, and if necessary, the internal use of astringents, such as infusion of rose leaves, elixir of vitriol, alum, acetate of lead and opium, &c.

If these means fail, and the hemorrhage continues, whilst the ovum is not expelled, there is little or no chance of preventing miscarriage; our endeavours must be directed to the suppression of the discharge, knowing it will generally cease as soon as the womb is emptied. The best agent we possess under these circumstances, is the *tampon*, or *plug*. This should never be used, however, if internal hemorrhage can take place to such an extent as to destroy life; in other words, not if the uterus be empty, and the patient far advanced in pregnancy. It may be used with safety and advantage, if the uterus be filled with its natural contents, or be only slightly distensible, even though empty. For this purpose some recommend a sponge steeped in vinegar, others a silk handkerchief, others, again, small, square pieces of linen pressed into the vagina till that cavity is entirely filled, the whole being retained in its place by a T bandage, or the hand of an assistant. It should be allowed to remain in situ, from six to twelve, or even twenty-four hours, the patient being still in a horizontal position, and the bladder, if necessary, relieved by the catheter. When withdrawn, the ovum, or fragments of it, will generally be found adherent to its upper part, along with a coagulum.

The tampon, it will be remembered, is not to be used under any circumstance where there is a hope of saving the pregnancy.

If the ovum is not discharged with the tampon, and cannot be reached with either the finger or hook, it is recommended to leave such occurrences in the hands of nature, rather than use force.

The *prophylactic treatment* consists in the avoidance of all causes of excitement, both mentally and bodily. Small bleedings and rest if she be plethoric; a nutritious diet and tonics if otherwise, together with careful cold sponging. When the abortion is habitual, and the uterus is irritable, an efficient remedy has been found in the administration of an opiate enemata every night, consisting of forty-five drops of tr. opii, in a wineglassful of starch water, rest, tonics, &c.

PATHOLOGY OF THE FŒTUS, AND SIGNS OF ITS DEATH.

The fœtus is liable to many of those diseases that attack the child after its birth. Many of these are entirely independent of the mother, but there are also many with which it is affected seriously through her. As examples of the latter may be classed those cases of premature expulsion which occur during the prevalence of epidemic diseases, and where the fœtus appears to have participated in the disease of the mother. Dr. Churchill has observed a considerable quickening of the action of the fœtal heart, some days after pregnant women have been attacked with fever. Examples are not wanting of cases where children have been born with small pox or measles; and according to Duettel, Schweig, Zurmeyer, &c., children born of mothers who were suffering under *intermittent fever*, have exhibited the same disease immediately after birth.

There is scarcely an internal organ that has not been described as the seat of inflammation; the brain and its membranes, the lungs and pleura, the peritoneum, the mucous membranes of the lungs and bowels, may all be the seat of inflammation during uterine life.

In addition to these acute diseases, the fœtus presents even more numerous cases of chronic affections; general hypertrophy, or atrophy, syphilitic diseases, worms, calculus, dropsy, jaundice, hernia, &c. Even the bones and joints may be the seat of disease; children are sometimes born with rickets, caries, and necrosis; and it has happened to many practitioners to meet with cases of fractures of some standing in children just born.

Unfortunately we possess neither the means of diagnosticating, nor of treating these cases of intra-uterine disease.

The signs of the death of the fœtus, are also obscure and uncertain. Absence of the sound of the fœtal heart is a negative sign, and its value will depend much upon the skill of the auscultator. If after repeated and careful auscultation of the abdomen no trace of fœtal pulsation can be detected, the death of the fœtus may be asserted on safe grounds. *Cessation of the movements of the fœtus* is no proof of its death, as the movements may be suspended for some days without its occurrence. The sensation of a weight in the abdomen rolling about as she moves, is, with some rare exceptions, a sure sign. The subsidence of the abdominal tumour, flaccidity of the breasts, after having been tense, and the general deterioration of the health, are all enumerated among the probable signs. The concurrence of all these render the diagnosis nearly certain, though separately they are of little value.

The signs during labour are much more accessible and certain. The loose, flabby scalp, the absence of swelling, occasionally emphysema of the cellular tissue beneath, the looseness and grating of the cranial bones, and the sharpness of their edges, are enumerated by Dr. Rigby among the certain signs. The absence of pulsations at the great fontanelles, is admitted to be an important sign.

In *presentations* of the *face*, the lips of a dead child will be flaccid and the tongue flabby and motionless, and the presenting part slightly swelled. The contrary in a living child.

In *breech presentations*, the sphincter ani in a dead child is relaxed and insensible to the finger. In a living child it is closed and resists the finger. The presence of meconium is a sign of no value.

In *arm presentations*, when the child is dead, the limb is cold, livid, and flabby, there is no pulsation at the wrist (the latter is not of much value, as pressure may arrest it), and the epidermis soon begins to peel off. In a living child, the arm will swell and become livid.

In *prolapsion of the funis*, the presence or absence of pulsation will decide. There are exceptions to this rule, however, as in the case related by Dr. Kennedy, in which the cord was prolapsed an hour, and during a pain no pulsation was perceptible; when the pain subsided he drew the funis backward towards the sacro-iliac symphysis, and then detected a faint pulsation. The child was delivered alive by the process.

Fetid liquor amnii is not a certain sign of the child's death, neither is the presence of meconium in it, especially in breech cases.

LABOUR.

By this term is understood, *that process by which the contents of the gravid womb are expelled.* It should commence as we have already seen, at or about the two hundred and eightieth day from the last appearance of the menses, or about one hundred and forty after quickening. The principal agent in affecting this process is the uterus itself, assisted, however, by the action of the diaphragm and abdominal muscles.

The *cause* of labour is not well understood: it has been variously attributed to the inability of the uterus to sustain farther distension, to the struggles of the fœtus in its endeavours to breathe, and to the absence of adequate nourishment. Whatever be the cause, certain it is that the fœtus contributes nothing to expediting the process, being entirely passive throughout, and the volition of the mother is but little concerned, farther than the assistance afforded by the voluntary contraction of the abdominal muscles and diaphragm, the action of the uterus being entirely involuntary. This action consists in the contraction of the muscular fibres, which enter into the composition of the uterine parietes. By this contraction the cavity of the uterus is diminished in size, propulsion is produced, and eventually expulsion is effected. The action of the uterus continues even after the child is expelled, for the purpose of extruding the placenta, and closing the orifices of bleeding vessels, which might otherwise give rise to serious hemorrhage.

The classification of labours.—Almost every obstetrical writer has a classification in accordance with his own peculiar views, each based upon his definition of a *natural labour.* Some include under the head of natural labour, all those cases which are terminated by the natural unassisted powers, without reference to the presentation. Among these are Hippocrates, Smellie, Baudelocque, Rigby, &c. Others consider that the presentation should be taken into account, and those only which occur most frequently should be called natural. Denman, Blundell, Davis, Ashwell, Ramsbotham, &c., therefore limit natural labours to head presentations.

The simplest classification seems to be that which includes *all* under two heads, viz.: *natural* and *preternatural. Natural labour,* or *Eutocia,* being that which follows a natural course, and in which the woman is delivered unassisted; *preternatural labour,* or *Dystocia,* signifying faulty or irregular labour, the course of which is unfavourable, and in which the assistance of the obstetrician becomes necessary.

The *general features* of labour are the same in every case, but the details are widely different. It is always attended with suffering, if the patient be conscious; and is sometimes complicated with irregularities and danger. The *duration* also varies much, as well as the amount of pain, in different women, and in the same women in different pregnancies, some expelling their children with a single pain, others requiring many to accomplish the same object.

The symptoms of labour may be divided into the *premonitory,* and those which indicate that the process has *already commenced.* The premonitory are, the subsidence of the abdominal tumour; some slight mucous discharge from the vagina, together with relaxation and distensibility of it and the external parts; and a peculiar irritability and restlessness on the part of the patient.

The diminution of the abdominal tumour is produced partly by the subsidence of the uterus into the pelvic cavity, and partly perhaps by the painless contraction of the same organ. It is sometimes very sudden in its approach, the woman finding on rising from her bed that she is much less than on the preceding day. It is generally a good sign, as indicating that she has a roomy pelvis. The increased discharge and relaxation of the external organs is also a good sign, showing that there is a disposition in the passages to facilitate the progress of the labour.

The irritability and restlessness is seen also in the lower animals, and is therefore not peculiar to the human female.

The symptoms indicative of the *commencement* of labour are, pain, glairy discharge from the vagina, irritability of the bladder and rectum, nausea and vomiting, and rigors or shivering, without the accompaniment of chilliness.

The *pain* felt in labour is due to the sensibility of the *resisting*, rather than to that of the *expelling* organs. The sharp, cutting pains of the commencement, which are technically called *grinders*, are produced mainly by the stretching of the cervex uteri and the vagina, and are generally referred to the lower part of the abdomen and the back, in a position corresponding to the position of the os uteri. These generally accompany the dilatation of the os uteri, and are indicated by the cries and gestures of the patient, the former being of a moaning, complaining character, the latter, twisting and writhing.

When, however, the dilatation has gone to such an extent as to allow some of the contents of the uterus to be propelled through the opening, the pains become of a *forcing*, *expulsive* nature, and the gestures attending them differ from those before mentioned. The breath is held; she no longer cries out, but makes strong expulsive efforts as if straining at stool; she makes use of the muscles of respiration to fix the thorax, and then contracts the abdominal muscles upon the womb, at the same time pulling violently upon anything within her reach. The gestures and cries are valuable indications of the character of the pains. The characteristic of the uterine pains is, that they are dull, and not very acute in their character; are felt mainly in the back and loins; that under their action the uterus becomes *tight* and *hard;* and, particularly, that they are *regular* and *intermittent;* that is, coming on at tolerably equal intervals, and succeeded by an entire relief from suffering.

At the commencement, the uterine pains are short, weak, and at long intervals; as labour advances, the interval becomes less, and the pains longer and stronger. It is well known that labour pains may be suspended, by any sudden emotion, particularly those of a depressing character, as well as by opiates, administered either by the mouth, rectum, or rubbed upon the general surface.

The *mucous discharge* which takes place from the vaginal surface, is known commonly by the name of *show*. It is generally mixed with the gelatinous mucus that blocked up the uterine cervix, and with more or less blood. "The more albuminous it is, the better, and it is always a good sign when lumps of albuminous matter come away from time to time; the thicker, softer, and more cushiony the os uteri is, the more mucus does it secrete." It is useful not only as a lubricating agent, but also as a topical depletion, for by unloading the congested vessels, the vascularity and heat of the part are diminished, and rendered more capable of dilatation.

The *irritability of the bladder* and *rectum* are among the most prominent signs of commencing labour, and are dependent upon the contiguity between the dilating os uteri and these organs, which all derive a portion of their nervous influence from the same source. The disposition to urinate exists even when the bladder is empty, and the tenesmic irritability of the rectum is equally independent of the presence of fæcal matter.

Nausea and *Vomiting*, at the commencement of labour, are looked upon as favourable signs, being indicative of a general relaxation, which favours the dilatation of the os uteri. It must not, however, be confounded with that which sometimes supervenes in lingering labours, which is rather prognostic of great exhaustion, and to be dreaded accordingly. In ordinary cases, vomiting in the early stages requires no treatment, being generally relieved as soon as dilatation takes place. When, however, it is very violent, it may often be checked by an effervescing draught, with a few drops of laudanum. The *rigors*, which often occur early in labour, are likewise accompaniments of the dilating os uteri, and although often severe, are not dependent on diminished temperature of the female, or irregular arterial action; they require little other treatment than an extra covering, and diluent drinks.

STAGES OF LABOUR.

Some obstetricians divide a labour into three, others into four, five, or six stages, all ending with the expulsion of the placenta. The first division is the one generally adopted, and the three stages are thus enumerated. The first terminates with the dilatation of the os uteri; the second with the delivery of the child; and the third with the expulsion of the placenta.

First stage.—This is generally the longest and most distressing, both to practitioner and patient. The pain, although not so great as in the second stage, is of a more distressing character, and more difficult to bear. The patient is more irritable, uneasy, and alarmed as to the result. The character of the cry, as before mentioned, as well as the gestures, are peculiar to this stage, as well as diagnostic of it. Nausea and vomiting also occur during this stage, and, it is thought, assist in effecting it.

By placing the hand upon the abdomen during a pain, the uterus can be felt to contract and harden itself, and at the same time to tilt forwards so as to bring its axis into accordance with that of the superior strait. As the pain goes off, the uterus becomes soft again, without, however, returning to its former state of relaxation.

The approach of a pain may often be foretold by the practitioner before its access, by auscultation. "The moment a pain begins, and before the patient is herself aware of it, we hear a short rushing sound, which appears to proceed from the liquor amnii, and to be partly produced by the movement of the child, which seems to anticipate the coming on of the contraction; nearly at the same moment all the tones of the uterine pulsations become stronger; other tones which have not been heard before, and which are of a piping, resonant character, now become audible, and seem to vibrate through the stethoscope, like the sound of a string which has been struck and drawn tighter, while in the act of vibrating."* As the pain grows stronger, the pitch rises. By the time the pain has reached its height, the sound has entirely ceased, or become very faint; as it departs, however, the sound again returns as at the beginning of the pain, and finally resumes its former tone, which it had during pregnancy. The noise made by the escape of the blood through the uterine veins during a contraction, is probably an important element in the production of the sound in question.

It is remarked also by the author quoted above, that the pulse increases in rapidity in proportion as the pain rises in intensity, subsiding in the same manner with it. As the labour advances, the rapidity of the pulse increases, so that shortly before the child is born, it has attained the maximum that it had during the height of the pains in the commencement.

A per vaginam examination at the commencement of labour reveals to us the condition of the parts through which the child is about to pass. If the vagina is cool, moist, and cushiony, and the os uteri soft and thick, the dilatation will most probably proceed favourably. If, on the contrary, the vagina is hot and dry, and the os uteri hard and thin, or hard and thick, the first stage will generally be tedious. *The time occupied in the first stage* varies very much in different women, and in the same women in different labours. In primiparæ, it is generally longer than in those who have had several children. Regular and genuine contractions seldom require more than eight to ten hours to perfect this stage, and often it is accomplished in much less. The dilatation also proceeds much more slowly at the commencement, than it does later; this is owing to the want of the mechanical dilatation which it afterwards receives by the formation of the bag of waters, which acts as a wedge, and forcibly distends the os uteri.

Bag of waters.—As the circle of the os uteri enlarges, the membranes of the ovum, containing a portion of the liquor amnii, protrude through the opening, forming a tense, elastic, conical bag; this by its mechanical pressure assists in the dilatation of the os uteri. During a pain it can be felt becoming more and more tense, and again relaxing as the pain subsides, so that the presenting part can often be detected through it.

Near the end of the first stage streaks of blood will often be found mixed with the mucus upon the finger, after an examination. This is commónly denominated in the lying-in-rooms "*a show*," and it is usually an indication that the os uteri is dilated, or nearly so. The hemorrhage proceeds from the slight vascular twigs extending between the uterus and the membranes, which are ruptured by the increasing dilatation.

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* Rigby, p. 159.

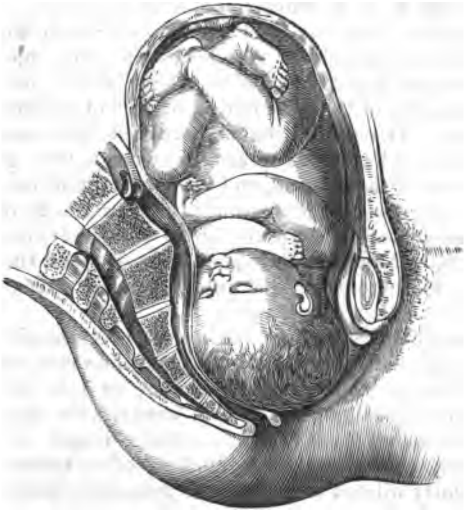
The phenomena which have been described are repeated during every succeeding pain (the intervals being shorter and the pains longer), until the dilatation of the os uteri is completed. During the whole period of the first stage, the pains have been acting, not so much for the expulsion of the child, as for preparing it and the passage for that purpose. The more completely the os uteri is opposite to the fundus, and the greater the correspondence between the axis of the uterus and that of the superior strait, the more speedily will the dilatation be accomplished. As soon as this has taken place, the first stage is ended.

Second stage.—The phenomena that present themselves in this stage differ essentially from those of the preceding. The pains succeed each other with greater frequency, and last longer, and the suffering is increased; but, in consequence of the respiratory muscles being fixed, in order to supply a fulcrum for muscular exertion, the woman rarely cries out during a pain. Hence the character of the cry, as before stated, is a diagnostic sign of this stage. The pains now appear not to be so much confined to the womb; they acquire a more *expulsive* character, and are attended with strong bearing-down efforts of the abdominal muscles. Upon the approach of each pain, the woman seizes hold of anything within her reach, and brings the muscles of the extremities, back, and abdomen to aid her in the effort. These are commonly called *bearing-down pains.* If the membranes have not ruptured previously, they generally give way during one of these pains, and the liquor amnii escapes through the external organs; the fœtus, forced downwards by the same contraction, immediately fills up the space previously occupied by the bag of waters, and the uterus condenses itself upon the body of the child, which is therefore folded into a smaller space, and is much more compressed than previously.

Each succeeding contraction pushes on the presenting part; but, as the pain goes off, it again recedes, not, however, to the point it occupied before, as there generally is more or less advance on that gained by the preceding effort. If it were not for this gradual advance and recession, there would be greater danger of laceration of the soft parts, from a continued expulsive effort before the passages were sufficiently dilated to receive the presenting parts. It thus not only takes away the danger of pressure, but is in itself a good sign, inasmuch as it proves that the cavity of the pelvis is sufficiently capacious. The woman during the second stage is much less irritable than in the first. She seems to have recovered her energy and equanimity, and, if this stage be prolonged, will often sleep between the pains. The young practitioner should be on his guard, however, in relation to this drowsiness, particularly if it occur in primiparæ, and be much protracted, or accompanied with headache, as it is indicative of congestion, and may be the precursor of convulsions.

During the descent of the presenting part, particularly if it be the head, we are often informed of its progress by the occurrence of an unpleasant symptom, viz., cramp in the lower extremities, produced by pressure upon the internal sacral nerves. Under the influence of another pain the head descends along the vagina and begins to press upon the perineum, the rectum becomes flattened, and its contents are involuntarily expelled; by the time it has reached the floor of the pelvis it is about to meet with its greatest resistance, viz., that of the perineum. Here again we observe the gradual advance and recession, until this part is distended to such a degree as to allow the presentation to escape over it. This distension is often so great, and the perineum so thin, that the finger can scarcely distinguish it from the presenting part. Occasionally it happens that from this cause the part is rendered transparent, so that the presentation is visible through it. Twice Madame Lachapelle has seen the hair of the fœtal head through the distended perineum (Fig. 20).

Fig. 20.



The presenting part has now entered the inferior strait, the coccyx is pushed backwards, and the external orifice is dilated; the anus projects, and the whole perineum is elongated; the labia majora, and even the mons veneris, are put greatly upon the stretch, and the former disappear entirely; this is not the case, however, with the labia minora, which can be felt even at the moment of the exit, and greatest distension. The sufferings of the patient are now at their height, and the pains are frequently "*double*," a new one commencing before the former has quite terminated. The force is at length so great, that all resistance is overcome, and with a cry of anguish the exit is effected. There generally succeeds an interval of rest for a few seconds or more, then the pains again return, and the remainder of the child is expelled.

The second stage is now completed, and the woman is entirely free from pain. If the hand be placed upon the abdomen, it will be found flabby and relaxed, and the uterus can be felt through the abdominal parietes, large, and moderately contracted.

The third stage is occupied by the detachment and expulsion of the placenta; the period occupied in effecting this varies much in duration. Sometimes it is expelled with the body of the child; at others, it is retained for some time after. Usually, after an interval of ten or fifteen minutes, pains of a different character follow; by these the detachment of the placenta is effected, and it is extruded into the vagina. By the voluntary efforts of the woman, assisted by the contraction of the vagina, it is entirely expelled, and the *labour* is completed. Its expulsion is commonly accompanied by a gush of blood, from which circumstance these pains have been called *dolores cruenti.*

The placenta generally enters the vagina inverted, that is with its fœtal face looking outwards, and the bag of membranes is also turned inside out. Especially is this the case, if traction has been employed upon the cord. After the expulsion, the uterus, now emptied of its contents, contracts into a firm hard ball, which can usually be detected for some days above the symphysis pubis. In this state of condensation it is about the size of a fœtal head.

PRESENTATIONS AND POSITIONS.

By the term *presentation*, we understand that part of the child which offers itself at the superior strait. By *position*, the relative situation of the presenting part to some cardinal point of the superior strait.

It will at once be seen that there may be a presentation for every square inch of the child's body, and a position for every degree in the circle of the superior strait. This, however, would lead to endless confusion; hence obstetrical writers have dininished the number greatly. Some make only *two* great presentations, viz., of the *head* and *breech*, looking upon all others as deviations from one of these.

Others include the above with their deviations, viz:

Cephalic presentations, including any part of the head.
Breech or pelvic, including the hips and loins.
Inferior extremities, including the knees and feet. Churchill.
Superior extremities, including the shoulder, elbow and hand.

Others, such as the back, belly, and sides, are so exceedingly rare, that it is not considered advisable to burden the student's mind with them, particularly as their treatment is the same as that of shoulder presentations.

The *diagnosis* of these different presentations may be described in general terms, as follows, viz.:

Of the *head*, by its hardness, by the presence of sutures and fontanelles, and by its shape.

Of the top or *Bregma*, by the shape of the anterior fontanelle.

Of the *face*, by its irregular shape, by the orbits of the eyes, by the nose, mouth, &c.

Of the brow, or forehead, by its shape, by the superciliary ridges, and by the anterior fontanelle.

Of the *breech*, by its softness, by the nates, organs of generation, tubera ischii, and often by the meconium, by the *single* prominence of the os coccygis, and by the sphincter ani muscle, which contracts when irritated by the finger.

Of the *knee*, by its rounded form, and by the condyles of the femur, and perhaps by the patella.

Of the *foot*, by its length, shape, position at right angles to the leg, by the equal length of the toes, the heel, &c.

Of the *shoulder*, by its rounded shape, by the clavicle, the spine of the scapula, the axilla, ribs, &c.

Of the *elbow*, by its sharpness, produced by the olecranon process.

Of the *hand*, by its shortness, the thumb and fingers, palmar and dorsal aspect, &c.

In regard to the *positions*, it is customary to note the relation between some point of the presenting part, and some other point in the brim of the pelvis; for instance, the first position of the vertex is that in which the posterior fontanelle is found behind the left acetabulum. The different positions will be spoken of in treating of the various presentations.

MECHANISM OF LABOUR.

"When the long axis of the child's body corresponds with that of the uterus, the child (provided the passages are round) can be born in that position; it matters little, so far as the labour is concerned, which extremity of the child presents, so long as this is the case; but where the long axis of the body does not correspond with that of the uterus, the child must evidently lie more or less across, and will present, with the arm or shoulder, a position in which it cannot be born. In stating this, we wish it to be understood, that we merely refer to the full-grown living fœtus, and not to one which is premature, or which has been some time dead in the uterus, as these follow no rule whatever. Hence the positions of the child, at the commencement of labour, resolve themselves into two divisions, viz., where the median line of the child's body is parallel with that of the uterus, and where it is not."—*Rigby.*

Vertex presentations.—The vertex may present at the brim of the pelvis in various positions; some obstetrical writers enumerate as many as eight, others only four, whilst a third class take the intermediate number of six. The latter is the division of Baudelócque, and the one most generally adopted in the schools. These are as follows, enumerated in the order of their most frequent occurrence.

1st.	Occiput at the	left acetabulum;	Bregma at the	right sacro-iliac junction.
2d.	"	right "	"	left " "
3d.	"	symphysis pubis,	"	promontory of the sacrum.
4th.	"	right sacro-iliac junction,	"	left acetabulum.
5th.	"	left " "	"	right "
6th.	"	promontory of sacrum,	"	symphysis pubis.

Naegelé and others make four, leaving out the fifth and sixth. Rigby makes only two, viz., the first and second, whilst Ramsbotham, Flamant, &c., make eight, adding to those already enumerated, 1st, the face inclining to the right ilium, the occiput to the left, the right ear behind the symphysis pubis, the left towards the spinal column. 2d, the reverse of the first, face to the left ilium, occiput to the right, right ear towards the promontory of sacrum, left behind symphysis pubis. The remaining six follow in the order given above.

According to the table given above, the first three are called *occipito-anterior*, the last three *occipito-posterior*.

In regard to the *frequency* of these positions, it may be stated that Naegelé maintains that the *fourth* position of the vertex is much more common than the second, and that the fifth and sixth are so rare that they are discarded entirely by many eminent practititioners, they having never met with them.

Cephalic presentations are by far the most numerous of the varieties that offer themselves, and of these, those of the vertex in the first position occur most frequently. Madame Boivin states, that in supervising twenty-thousand five hundred and seventeen labours at the Maternité Lying-in Hospital, at Paris, she found fifteen thousand six hundred and ninety-three cases in which the vertex presented in the first position.

The greater frequency of vertex presentations may be readily accounted for. It will be remembered that the fœtus hangs suspended in the liquor amnii by the umbilical cord, which is attached nearer to its pelvic than its cephalic extremity; the head being the heaviest part, consequently becomes the most dependent.

Neither is it difficult to explain why the head in labour more commonly presents itself in the occipito-anterior, rather than in the contrary way. The child in utero naturally lies on its back, with the head inclined downwards towards the orifice of the womb. The long diameter of the womb, at the end of pregnancy, and especially at the commencement of labour, dips at an angle of about forty-five degrees towards the horizon in a woman, who is sitting or standing up. The child being in a complete state of flexion both as to its body and limbs, would naturally roll, so as to bring that part of its body which is convex, to adapt itself to the concavity of the womb. This will of course be its back. The uterus at the same time rests upon the abdominal muscles anteriorly, which form a soft cushion for it. The head can only pass the brim of the pelvis (superior strait), by the adaptation of certain of its diameters to those of the pelvis. The longitudinal diameter of the child's head is four and a half inches, whilst the antero-posterior diameter of the superior strait is only four: it must therefore adapt itself either to the oblique or the transverse; of these, the oblique is most common. Suppose it to be a first position, in which the longitudinal diameter corresponds with the oblique of the superior strait, the vertex is behind the left acetabulum, and the forehead at the right sacro-iliac junctions. The two fontanelles will be at first on a level.

The first step in the mechanism of labour is the *flexion of the head*, or the approach of the chin to the breast. This is produced by the action of the uterus pressing the head downwards into the cavity. Being pressed from above downwards, the spine causes the head to bend forwards, so that the occiput sinks towards the centre of the pelvis, and the chin is squeezed firmly against the breast.

By this movement, the diameters of the child's head are brought into correspondence with such diameters of the pelvis as will allow its ready transmission. The occiput occupies the centre of the superior strait; the occipito-bregmatic diameter corresponds to the oblique diameter of the pelvis, which extends from left to right, and from before backwards; the bi-parietal represents the other oblique diameter; the occipito-mental is parallel to the axis of the pelvic circle, and the occipito-bregmatic circumference corresponds to the plane of the strait.

Next follows *rotation*, by which is meant, the screw-like movement of the head in the excavation, by which the vertex is brought to the symphysis pubis.

By the continued action of the uterus, the head is pushed into the excavation until it reaches the floor of that cavity; here its progress is arrested and the direction changed by the gliding of the occiput upon the left anterior inclined plane, from behind forwards and from left to right, so as to place itself behind the symphysis pubis. Whilst the vertex is executing this movement, the forehead glides from right to left, and from before backwards, on the right posterior inclined plane, so as to fall into the hollow of the sacrum. In executing this rotation, or pivot motion, the head turns upon its long diameter.

The third stage is *extension*, which signifies the departure of the chin from the breast.

This commences as soon as the occiput begins to emerge, and is completed when the child's head is entirely born. Instead of continuing to bend forwards, the head now tends to turn over backwards, so as to bring the occipito-mental diameter into correspondence with the axis of the inferior strait.

After the head is fairly engaged in the inferior strait, it is no longer in the same relation to the diameter as before; its great diameter and occipito-bregmatic circumference, however, have not undergone any change, for we find, that at the inferior strait, as well as at the superior, they still represent the plane and axis of that strait. The bi-parietal diameter corresponds to the transverse of the inferior strait, and the occipito-bregmatic to the antero-posterior. The great end of *rotation* is to produce this relation between the diameters, to effect the exit of the child's head.

The last stage is *restitution*, by which is meant, the turning of the vertex again to that side of the pelvis, towards which it was directed before the labour began, or before rotation took place. As soon as the head is born, all restraint is taken away from it, and as it is incapable of retaining the twist which brought it under the arch of the pubis, it returns to its natural position upon the shoulders, which had been temporarily changed. In the position now under consideration, the vertex turns towards the left thigh of the mother, and the chin to the right. A short interval of ease succeeds the birth of the head, after which the shoulders enter the excavation. They also enter obliquely, and perform the rotation as above described. The right shoulder is behind the right acetabulum, and rotates from right to left on the right anterior inclined plane towards the symphysis pubis; the left is at the left sacro-iliac junction, and rotates from left to right on the left posterior inclined plane into the hollow of the sacrum. The right shoulder generally appears first at the pubic arch, whilst the left escapes over the perineum; the vertical axis of the child's body is bent, so as to accommodate itself to the axis of the pelvis, which, it will be remembered, is a curved line. After the shoulders emerge, the rest of the body is expelled without anything peculiar to demand description.

In the *second position* of the vertex, the mechanism differs but little from that of the first; the same forces are brought to bear upon the child, and the same diameters offer themselves to the principal diameters of the pelvis; the head also executes the same movements as in the preceding. The vertex, however, in this case, is behind the right acetabulum, and rotates from right to left on the right anterior inclined plane, and the forehead on the left posterior inclined plane into the hollow of the sacrum. At the inferior strait there is no difference between the two positions; but after the escape of the head, the vertex turns towards the *right thigh*, the left shoulder comes under the arch of the pubis, and the right falls into the hollow of the sacrum; but in these changes there is no variation from the proportional relations between the fœtal head and the maternal pelvis.

This is considered by some obstetricians as not so favourable a position as the first, in consequence of the impediment offered by the rectum to the rotation; this is not believed to be a valid objection, as the rectum can be easily emptied, and then offers but a slight obstacle.

The *third position* is confessedly so rare that some obstetrical writers have banished it entirely. Baudelocque admitted it rather to fill up his plan, than from any evidence of his senses. Madame Boivin met with it only six times in twenty thousand five hundred and seventeen cases. Velpeau also is sceptical as to its existence.

When it does occur, its mechanism is a little different from the preceding; the occiput is at the pubis, and the forehead at the promontory of the sacrum. In this case, the occipito-mental diameter corresponds with the axis of the superior strait, and the occipito-bregmatic circumference with the plane of that strait.

The bi-parietal diameter, however, is situated transversely, and the occipito-bregmatic from front to rear. There is no rotation necessary in this case, and none occurs, consequently there is no restitution.

The shoulders commonly enter transversely, although they generally emerge with one at the sacrum and the other at the pubis, without our being able to tell beforehand which it will be. In the rest of the labour there is nothing peculiar.

The *fourth position* of the vertex is the most common of the occipito-posterior varieties. In this position the same diameters correspond as in the first; but, the situation of their extremities is reversed. Engagement takes place more easily, and the head descends into the excavation more readily than in the occipito-anterior positions, until it reaches the floor of the pelvis. Instead of extension occurring readily now, a greater degree of flexion is demanded, so as to enable the occiput to rotate into the hollow of the sacrum, which it does, from right to left, upon the right posterior inclined plane, whilst the forehead, or anterior fontanelle, slides forward upon the left anterior inclined plane, from left to right.

The vertex is born first, over the perineum, and extension takes place backwards, so that the posterior fontanelle, the sagittal suture, the anterior fontanelle, the parietal protuberances, and the several parts of the face, are successively seen in front of the perineum. Immediately after the birth of the chin, restitution takes place; the face turns towards the left groin, and the occiput towards the posterior part of the right thigh of the mother.

The left shoulder rotates to the front under the symphysis pubis, while the right falls into the hollow of the sacrum.

M. Naegelé states that this position is more common than the second, and that rotation takes place from behind forwards, so as to bring the occiput under the pubes, instead of into the hollow of the sacrum, as already described. In this opinion he is confirmed by Professor Meigs.

In the *fifth position*, the back of the child is directed to the left and backwards, the right shoulder to the left and forwards, and the left, to the right and backwards; the bi-parietal diameter corresponds with the left antero-posterior oblique, and the occipito-bregmatic with the right antero-posterior oblique diameter; the lesser circumference of the fœtal head, and the occipito-mental diameter, are parallel with the plane and axis of the strait. Rotation of the vertex takes place upon the left posterior inclined plane, into the hollow of the sacrum, while the forehead, gliding upon the right anterior inclined plane, is brought to the symphysis pubis.

After the birth of the head, *restitution* takes place, with the occiput to the inside of the mother's left thigh, while the face looks towards the right. This is said to be a more difficult position than the preceding, in consequence of the presence of the rectum, which retards the progress of the occiput.

In the *sixth position*, as in the third, there is neither rotation, nor restitution; the occipito-bregmatic diameter corresponds with the antero-posterior, and the bi-parietal with the transverse.

It is less favourable than the corresponding oblique positions, in consequence of the liability of the forehead and face to be turned downwards, and thus permit the long diameter of the head to be brought into parallelism with the short diameter of the pelvis.

In all these occipito-posterior positions, there is much greater distension of the perineum than in the occipito-anterior, in consequence of the head having to descend lower; they are therefore more tedious and painful.

It is by no means an easy matter to diagnosticate the *positions* of the vertex; it requires great delicacy of touch, and considerable experience. The movements of the child, and the stethscope, are valuable assistants to the sense of touch. Naegelé observes that when the movements are felt most on the right side, the head is probably in the *first* position, when on the left, in the *second*.

The stethoscope also informs us of the situation of the fœtal heart, and when this is decidedly known, it becomes an easy matter to define the position of the head.

CONDUCT OF A LABOUR.

The conduct of a labour includes all that is done for a parturient patient from the beginning of her pains till the uterus is emptied, and the safety of both mother and child secured. It is not to be understood by this, that the accoucheur is to substitute himself for nature; on the contrary, he really has little to do in most cases, except to receive and protect the child, to deliver the placenta, and watch over the mother and her offspring for some hours after the delivery.

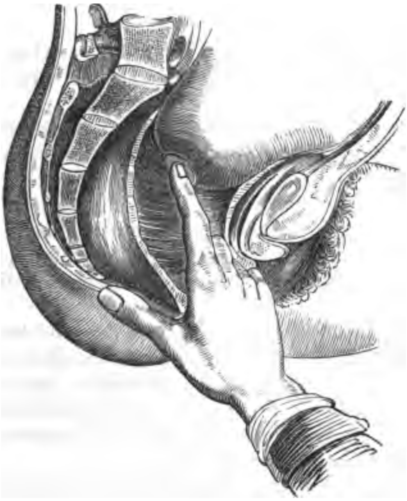
Whilst thus he is ready to let nature assist herself, he must be prompt to recognise and avert any danger that may arise.

It is well for the practitioner always to be provided with a lancet and an elastic male catheter; and if he live in the country, with a little laudanum. The first duty of the attendant is, to ascertain *her present condition, whether in labour or not,* and if so, *how long she has been in labour, the nature of the presentation, the rate of progress, and probable termination.*

The first conditions will be readily discovered, by examining the skin, pulse, tongue, &c.; then directing the attention to the pains, noting their character, frequency, duration, &c., the character of the outcry, the gestures of the patient, and the state of the vaginal discharge. By these symptoms he will be enabled to judge of the existence of labour or not, the stage and rate of progress, and also of the necessity for a more particular examination.

One of the first duties of the practitioner, after the above inquiries have been attended to, is to discover the condition of things by a per vaginam examination; this, it need hardly be said, should always be proposed in the most delicate manner. There is much information to be gained during the first examination (and it should *never* be *needlessly* repeated); first, whether she be really pregnant; secondly, if she be in labour;

Fig. 21.



thirdly, whether the membranes have ruptured or not; fourthly, the nature of the presentation; fifthly, the stage and progress of the labour; sixthly, the state of the os uteri, vagina, and perineum; he is also to take the opportunity of estimating the capacity of the pelvis, and other circumstances which may influence the duration of the labour. (Fig. 21.)

It is scarcely necessary to repeat this examination during the first stage, if all is right; but in the second, it should be regulated by the rapidity of the advance, and when once the head has reached the perineum, the finger should be kept upon the head during each pain, so as to regulate the amount of support for the perineum. The finger ought always to be introduced *during* a pain, but the examination should also extend to the *interval.*

During the first stage, the patient need not be confined to the bed, but may be allowed to sit up, or even to walk about, if she desire it. Neither is it incumbent upon the medical attendant to remain in the lying-in room during the first stage; his presence may be a restraint upon the patient.

The condition of the bowels should always be early attended to, and if they have not been acted upon lately, should be unloaded either by an enema, or an aperient. The bladder should also be emptied, either spontaneously, or by the catheter. The diet of the patient, when the first stage is protracted, should be of a light, unstimulating character; the object being to sustain nature while under a severe effort, at the same time that we carefully avoid calling that effort in the direction of the digestive organs.

There should always be in readiness several strong ligatures for the cord, a pair of sharp scissors, some strong pins, and a "binder," or broad bandage for the female. It is likewise the duty of the accoucheur to see that the bed is properly prepared for the patient. This is best done by spreading a piece of oiled cloth upon the mattress to protect it at the point the patient is about to occupy; over this may be placed several blankets or coverlets, folded square, to receive the discharges, &c. These latter can be easily removed after the labour is completed, without disturbing the patient, leaving the bed-linen beneath unsoiled.

The *second stage* is often announced by the rupture of the membranes. As soon as this occurs the patient should retire to her bed, and the practitioner make an examination, in order to determine more accurately the position, and inform himself of the advance of the head.

In this country and in England, it is usual to place the woman upon her left side, with her hips close to the edge of the bed, and her knees drawn up towards the abdomen. The position enables the practitioner to use his right hand with advantage, and is also supposed to favour the engagement of the head in the first position.

If the membranes have not ruptured at the commencement of this stage, and the head has passed the circle of the os uteri, they may be broken either by pressing the finger upon them during a pain, or by means of a probe passed along the index finger, provided always, that it is not a first labour, and the attendant is satisfied that their usefulness as a dilating agent is at end.

When the head has reached the floor of the pelvis, and is beginning to distend the perineum, the latter should be supported by the palm of the left hand (guarded with a soft napkin), in such a way as to delay the passage of the head slightly, and to bear it towards the pubis, so as to prolong the curve of the sacrum, and make certain of the head being carried forward to the anterior orifice of the vagina, and not allowed to perforate the perineum for want of a just support.

As the head escapes from the os externum, it should be received in the hand of the practitioner, and allowed to perform the motions of restitution, carrying it forward as the shoulders are expelled; he should also be careful to observe whether the cord is twisted about the neck, and if it be to disengage it. The perineum should be supported during the exit of the shoulders, and the whole body carried forward in the axis of the pelvic outlet, and not by any means *pulled out*, in order to relieve the woman from pain, and facilitate the delivery.

When the child is entirely born, and respiration is established, or the cord has ceased to pulsate, it may be separated from the mother. To do this, one strong ligature should be tightly tied around the cord about two inches from the umbilicus, and another about an inch further on, and the cord cut between them. The two ligatures are useful in case of twins, which sometimes have a common placenta, and also for the sake of cleanliness.

The accoucheur should then place his hand on the abdomen of the mother, for the purpose of ascertaining whether there be a second child or not, and also to discover, from the state of contraction of the uterus, whether the placenta be discharged or not.

If the uterus be well contracted, the placenta will probably be found in the vagina; as soon as it has descended so low that he can feel the insertion of the cord, he may withdraw it by gentle traction in the axis of the vagina. No force should be used in this operation, for fear lest the placenta should be still adherent, and thus the risk of inversion be produced, or the cord torn from its insertion. The pudendum should now be carefully and gently dried, and covered with warm napkins; after which the binder should be so applied as to extend from the pubes to the ensiform cartilage, and drawn moderately tight, thus affording an adequate support for the uterus and abdominal viscera.

The wet sheets, &c., may now be removed from under her, and the patient covered over to prevent chilliness, and then left to have an hour's rest before she is made comfortable in bed.

The child should be put to the breast as soon as the mother is sufficiently rested. It is not only useful to the child by supplying it with the early secretion, which is laxative, but it is also beneficial to the mother, inasmuch as it excites contraction of the uterus.

The diet of a woman lately delivered should be as light as possible, consisting mainly of the farinaceous articles; and she should be kept in a strictly horizontal position till all danger of hemorrhage has passed.

About half an hour after the labour is completed there often occur a succession of painful contractions called *after-pains*. During their presence, the discharge from the uterus increases and coagula are frequently expelled; their operation is salutary within certain limits, they prevent hemorrhage, diminish the size of the uterus and expel its contents; they are rare in primiparous women. If very severe they may be diminished by small doses of camphor and opium.

The *lochia* is the name given to the discharge that continues after labour is completed. For some days it retains the character of blood; but it finally loses its firmer portions and red globules, in consequence of the continued contractions of the uterus, and becomes of a greenish tint. It comes from the patulous orifices of the vessels on the uterine surface where the placenta was attached, and disappears as these become compressed by the uterine contractions. It usually lasts three weeks, though sometimes longer.

General directions have been given for the management of the child after birth; it sometimes happens that it requires further attention at the hands of the practitioner, owing to some pathological condition into which it may have fallen. For instance, when born it may be in a state of *defective vitality*, *asphyxia*, or *apoplexy*. The first condition may be produced by excessive uterine hemorrhage, by too early a detachment of the placenta, or by defective nutrition. This will be recognised by the feeble efforts at respiration, and the weak and irregular action of the heart. Under these circumstances no advantage is gained in preserving the connexion between the mother and child; the cord should be tied and cut, and the infant immersed in a warm bath of the temperature of 97° or 98° Fahr. If after a few minutes, the child does not gasp, and we observe that the heart is acting less forcibly, a longer continuance in the bath will do harm; it should, therefore, be removed, and cold sprinkling tried, or what is better, gentle stimulation by means of frictions over the general surface, and, if necessary, artificial respiration.

In the *second condition*, the child is sometimes asphyxiated by pressure upon the cord, or by being delayed in the passage in a tedious labour. Here it would be obviously improper to cut the cord; the practitioner should resort to frictions, cold aspersions, or water poured from a height upon the epigastric region, artificial respiration, &c. Should these means fail, he may try the effect of bleeding, by cutting the cord and allowing about a table-spoonful of blood to escape; if this is unsuccessful, the case is probably hopeless.

The *third condition* is most frequently produced by long-continued pressure, or, from an interval elapsing between the birth of the head and that of the body. Under these circumstances, the action of the heart is weak, and the pulsation in the cord feeble and oppressed, the surface is blue, and the face livid; and, occasionally, it happens that the form of the head is altered. Bloodletting is here obviously indicated, and it should be done by cutting the cord and allowing from half an ounce to an ounce to escape; when it will generally be found, that the surface becomes of a natural hue, the pulse quicker and firmer, and an attempt is made to respire. If the child does not breathe, a sudden puff into its face, or a slap upon the buttocks, will often establish respiration, or the means above-mentioned may be resorted to.

The tumour that is often found upon the scalp of new-born children, called *caput succedaneum,* and which is produced by the extravasation of blood, or effusion of serum beneath it, generally disappears spontaneously, or by the application of spirit or some stimulating lotion.

Hemorrhage from the navel after the separation of the cord is sometimes very troublesome, and may be treated by means of astringents, cautery, compresses, &c.; if these means fail, Dr. Churchill recommends to stretch open the navel and fill it with plaster of Paris, either dry or moistened, allowing it to remain till solid. Others propose to cut down upon the vessel and tie it. A less formidable operation has been successfully practised in this city, by the late Dr. J. M. Wallace, by passing two needles through the navel parallel with the surface of the abdomen, and at right angles to each other, and applying a ligature beneath them, as in the operation for aneurism by anastomosis.

TEDIOUS LABOUR.

The labour is often prolonged beyond the usual limit by a delay in one of the three stages, and yet may be completed without either manual or instrumental assistance.

In the *first stage* it often depends on an undilated os uteri; this more frequently occurs with first labours, and also in women of advanced age, than under other circumstances. On examination, the os uteri is found in one of two conditions, either thin and hard, or semi-pulpy and œdematous, and but little influenced by the pains, which may be frequent and very severe. It may also be undilatable from the presence of cicatrices.

One of the most effectual remedies for this condition is venesection, which may be carried sometimes to a great extent, provided there be no contraindication. Dr. Dewees once took away as much as two quarts. The blood should be drawn rapidly and from a large orifice; if the patient becomes faint, so much the better. The bloodletting may be assisted by an opiate enema, by the administration of tartar emetic in nauseating doses, or by the application of belladonna ointment to the cervix. The warm bath has been recommended by some practitioners and disapproved of by others. Moral influences have, at times, a good effect; changing the dress, or the bed, changing the position, &c., are often of service. Some practitioners recommend mucilaginous injections to be thrown into the vagina.

There is another condition of the os uteri which is often a cause of delay, where the anterior lip is caught between the head and symphysis pubis and its retraction prevented. This may result either from an obliquity of the uterus, or more probably from an unequal dilatation of the anterior and posterior lips, the latter dilating most rapidly.

The remedy is simple and easily applied. During the interval between the pains, when the os uteri is soft and dilatable, the practitioner should gently push back the anterior lip over the crown of the head and hold it there during the succeeding pains,—a proceeding which, if nicely accomplished, will soon be followed by the expulsive pains of the second stage.

Premature rupture of the membranes.—This may occur either through their own weakness, or from violence, either accidental, or from the officious meddling of the accoucheur. The result is, that the os uteri, instead of being dilated by the bag of membranes, which is soft and wedge-like, comes at once in contact with the child's head, which is not by any means so good a dilator. The only remedy is patience. An examination should be made early, in order to correct the presentation without loss of time, should it be abnormal.

Excessive quantity of liquor amnii is sometimes enumerated as a cause of tedious labour; and this is apt to be in excess when the patient is feeble, and the child small and ill-nourished. The treatment for this is rupture of the membranes; but it should not be practised without due caution, or it may produce tedious labour from the cause mentioned in the preceding paragraph.

In the *second stage*, the labour is often rendered tedious by the feeble and irregular action of the uterus; when this exists, the interval between the pains is long, and the pains themselves are feeble and short, and have little or no effect on the child. This state of things is not uncommon in delicate women, or in the reverse; or it may be produced by mental depression, a deranged state of the digestive organs, or, it may arise from hereditary transmission.

In the treatment of these cases, it is above all things necessary to keep up the patient's spirits; all causes of irritation should be removed, and she should be allowed to change her position. In some cases it may be right to administer an opiate, so as to recruit her by sleep, and in all cases a stimulating enema will be found of service, especially if the bowels are loaded, and the delay depend on this cause. But the most effectual remedy in these cases, is the *ergot of rye*, a remedy which seems to possess a power of certain, direct, and speedy action on the uterus, causing it to contract almost unremittingly till its contents are expelled. Besides the power of strengthening feeble pains, Dr. Ramsbotham has shown that it is capable of *originating* uterine action.

It may be given either in substance, infusion, or tincture, in the dose of from fifteen to twenty grains of the powder, till a drachm is taken; half a fluid-drachm to one fluid-drachm of the tincture; or, the same quantity of powder as above directed, mixed in hot milk or coffee.

It is, however, to be given with caution, as results fatal both to mother and child have followed its injudicious administration.

The indications for giving it are, according to Dr. Churchill, 1st, feeble and inefficient pains without especial cause; 2d, if the os uteri be soft and dilatable; 3d, if there be no other obstacle to a natural delivery; 4th, if the head or breech present, and are sufficiently advanced; 5th, if there be no threatening head symptoms, nor excessive general irritability.

But, on the other hand, it should not be given, 1st, if the os uteri be hard and rigid; 2d, if the presentation be beyond reach; 3d, if there be a mal-presentation; 4th, if the pelvis be deformed; 5th, if there be any serious obstacle to delivery in the soft parts; and, 6th, if there be head symptoms, or much general irritation.

Toughness of the membranes, even after the os uteri is dilated, is sometimes a cause of tedious labour; but, when once ascertained, it admits of an easy remedy; if the pains are active, and the os uteri dilated, they may be ruptured without ceremony. The practitioner should cut a notch in his finger nail, and *saw* through the membranes, at the most dependent part, during a pain.

Sometimes they protrude unbroken, down to the os externum, and in some few cases, the child has been expelled with the bag of membranes and placenta *en masse;* under such circumstances, it would certainly be drowned in its own liq. amnii if assistance were not at hand to rupture them, and enable the child to breathe.

Rigidity of the soft parts is a very common cause of delay in women who have borne children late in life, or who are of a plethoric condition, with a well-developed muscular system. In such, the head makes little or no progress, although the pains be strong and frequent. If this condition of things last long, the patient will fall into a state of exhaustion or constitutional irritation; or inflammation and sloughing of the soft parts from long-continued pressure will ensue.

The indications in the treatment are, 1st, to *gain time;* 2d, to *counteract inflammation.* These will be fulfilled by a moderate bleeding, if the constitution will bear it; by a dose of opium, to moderate or suspend the uterine action; and by small doses of tartar emetic, with the hope of relaxing the system. To these means may be added, warm hip-baths, warm mucilaginous fomentations to the parts, and the introduction of unirritating unguents into the vagina.

If the rigidity be dependent upon the presence of *cicatrices* of the os uteri, vagina, or perineum, the result of laceration or sloughing in former tedious labours, or occasioned by the ill use of instruments, the same rules for treatment may be adopted.

The uterus may acquire an *inclination* one way or another, during pregnancy, from different causes, and this oblique position of the organ may be a cause of delay in the progress of the labour. In women who have borne many children it is often owing to relaxation of the abdominal muscles, which permits the uterus to fall forwards, and thus the child's head, instead of being propelled into the brim of the pelvis, is driven back against the upper part of the sacrum. The nature of the obliquity is detected by a per vaginam examination, which reveals the position of the os uteri; if it be *lateral,* place the patient on the *opposite,* side; if *anterior,* let her lie on her back, and support and draw up the fundus uteri by means of a towel or napkin passed beneath the pendulous belly and fastened behind the back, until the head shall occupy the inferior strait.

There are various other causes that may render a labour tedious, such as an over-distended bladder, or a rectum filled with hardened fæces, a rheumatic condition of the uterus, tumours, and deformities of the pelvis, &c. In the first case, the remedy is found in the introduction of the catheter and drawing off the water; in the second, a stimulating injection should be given, or, if necessary, the hardened fæces removed with the handle of a spoon; in rheumatism of the uterus, the patient generally complains of feverishness and restlessness, the abdomen is tender, the urine scanty and high-coloured, for some time before labour sets in. The contractions of the uterus are rendered exceedingly painful, and at times inefficient. The treatment consists in bloodletting, warm fomentations, an aperient of mag. sulph. and sodæ carb., and alkaline drinks.

Tumours and deformities of the pelvis require instrumental aid, and render an otherwise natural labour, preternatural.

PRESENTATIONS OF THE BREGMA, OR TOP OF THE HEAD, AND OF THE BROW.

Presentations of this portion of the head are dependent upon a departure of the chin from the breast, and are regarded as deviations from an occipital presentation. There are the same number of positions of this presentation as in those of the occipital, viz.:

1.	Vertex to left acetabulum.	Forehead to right sacro-iliac junction.
2.	" right acetabulum.	" left " "
3.	" symphysis pubis.	" promontory of sacrum.
4.	" right sacro-iliac junction.	" left acetabulum.
5.	" left " "	" right "
6.	" promontory of sacrum.	" symphysis pubis.

The diagnosis of this presentation is readily made by discovering the quadrangular fontanelle, occupying the centre of the opening. The various positions engage less readily in consequence of the head offering a larger surface to the os uteri, and because the occipito-frontal diameter cannot readily descend into the excavation while the thickness of the walls of the neck of the uterus is added to it.

If discovered before the head has engaged, it may be corrected by pushing up the forehead and pulling down the occiput. Should the head have descended, however, the movements of flexion and rotation should be aided by the hands of the practitioner.

In all cases where the anterior fontanelle offers itself originally, there is a natural inclination for the case to be converted into a perfect face presentation; and this is owing to the fibres of the fundus uteri exerting themselves strongly upon the fœtal body; under which action the shoulders are pressed downwards, the chin is gradually separated more and more from the chest, and the head is expelled in the manner hereafter to be described.

We should endeavour to place the head in a more favourable position, by throwing the chin more upon the chest, and causing the vertex to descend; provided this could be accomplished without incurring danger, without any aggravation of suffering, and without the formidable appearance of preparing for an operation. This object can frequently be gained, if the position be detected soon after the rupture of the membranes, and before the head has perfectly engaged in the pelvic cavity, by a very simple and easy method; it only requires that steady pressure should be made upon the brow with the extremity of the finger during the urgency of pain, so that the forehead may be arrested at the spot to which it has attained, and the powers of the uterus be expended upon the back part of the head. It is then usually observed that the head is bent forward on the neck, as on a hinge; the vertex comes down, the brow remains stationary; and thus the case may be made one of the most simple, natural, and easy.

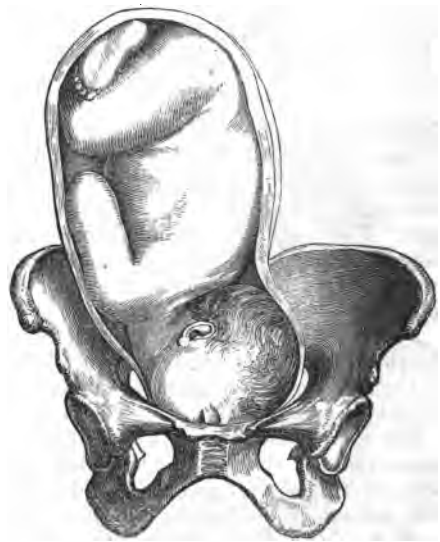
The attempt should only be made during the paroxysm of pain: it is not possible to *push* the anterior fontanelle *up above* the brim; the only intention should be to prevent it passing *down further*, and to give an opportunity for the back part of the head to occupy the pelvis more completely. This counter-pressure, nevertheless, must be made with caution, tenderness, and judgment.*

FACE PRESENTATIONS.

Face presentations are deviations from those of the occiput, and are not by any means as dangerous as they were formerly supposed to be. Madame Lachapelle has laid it down as a fixed principle, that this sort of labour is nearly as easy and as natural as that by the vertex, and affirmed, that out of seventy-two cases of this kind, forty-two were delivered by the unassisted efforts of the female, without danger either to mother or child. They are therefore included under the head of *Natural Labour.*

The *causes* of face presentations are obscure, and have been variously described by authors. Some suppose that they are caused by the inclination or obliquity of the fœtus itself, rather than of the organ which contains it. Madame Lachapelle attributes them to the circumstance that the anterior obliquity of the womb being very common, the weight of the occiput must in such cases prevent the chin from being applied to the breast; and must bring the mento-bregmatic diameter into parallelism with the sacro-pubic diameter, from the very commencement of the labour. Paul Dubois thinks they are

Fig. 22.



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* Ramsbotham's process of Parturition.

primitive, and probably produced by the active movements of the fœtus itself, and the following is his explanation. "At any time during gestation, the chin may depart from the breast; if the fœtus retains this position till the end of pregnancy, it becomes permanently fixed in it at the commencement of labour, by the rupture of the membranes, and the contractions of the uterus."

By most authors, obliquity of the uterus has been looked upon as the principal cause of face presentations. If at the commencement of labour the uterus is so oblique as to throw the fundus far over to the right side, the child presenting by the head and the vertex in the first position, the direction of the expulsive force operating on the infant will propel its head against the edge or brim of the pelvis, and either cause it to glance upwards into the iliac fossa and let the shoulder come down, or it will be turned over, so as to let the face fall into the opening, and thus produce a face presentation, in which the chin will be directed to the right side, and the forehead to the left of the pelvis. (Fig. 22.)

It will therefore be seen, from this explanation, that face presentations are deviations from those of the vertex. From this circumstance some authors make the same number of positions for them as for vertex presentations, as follows:—

1.	Forehead to	left acetabulum.	Chin to	right sacro-iliac junction.
2.	"	right "	"	left " "
3.	"	symphysis pubis.	"	promontory of sacrum.
4.	"	right sacro-iliac junction.	"	left acetabulum.
5.	"	left " "	"	right "
6.	"	promontory of sacrum.	"	symphysis pubis.

Others again make four, corresponding to the four *oblique* positions of the vertex, while some enumerate the same number, disposing them *transversely*, and from *front to rear*, admitting a *right mento-iliac* and a *left mento-iliac*, a *mento-pubic* and a *mento-sacral position*. These positions having all been established, it is proper that they should be mentioned. Presentations of the face, however, are nearly always resolved into two only, viz., right mento-iliac and left mento-iliac, as follows:

First position.—Forehead to the left ilium, or left acetabulum, and the chin to the right ilium, or right sacro-iliac junction, the bridge of the nose representing the line described by the sagittal suture in the first vertex position. (Fig. 22.)

The *second position.*—Forehead to the right acetabulum, or right ilium, and the chin to the left ilium, or left sacro-iliac junction. (Fig. 23.) The first position is a deviation from either the first or fifth position of the vertex; the second, from the second or fourth.

Mechanism.—In the first position, the right side of the face is anterior, and therefore more depressed than the other on entering the brim, and the finger touches the right eye or zygoma first, on making an examination; if the labour is a long one, this part of the face is swollen and livid. The face comes down transversely with the bi-malar, or rather the bi-temporal diameter, in coincidence with the antero-posterior of the superior strait, and the fronto-mental with the transverse. As the head is forced down into the excavation, *extension* first becomes as great as possible, then the chin rotates upon the right anterior inclined plane until it gets under the arch of the pubes; while the anterior fontanelle glides in an opposite direction upon the left posterior inclined plane, and falls into the hollow of the sacrum. As the chin emerges, it rises up towards the mons veneris, performing in this case the movement of *flexion*, instead of *extension*, as in vertex cases; the forehead, followed by the sagittal suture and occiput, passes gradually down the plane presented to it by the anterior surface of the coccyx and perineum, in front of which all these parts are successively disengaged. (Fig. 24.)

Fig. 23.

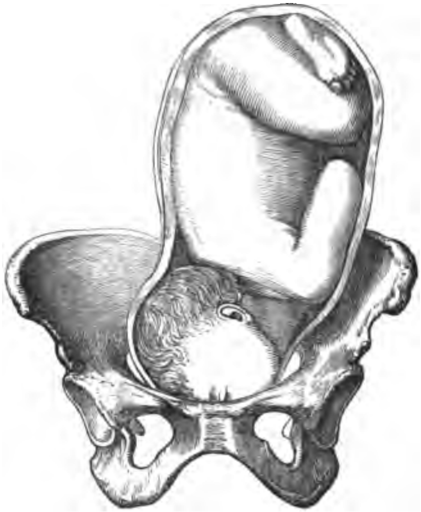
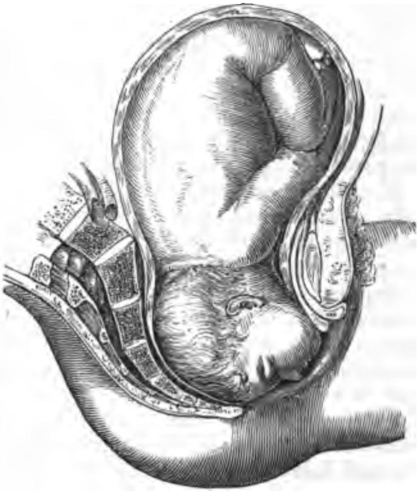


Fig. 24.



The *second position* is merely the reverse of the *first;* the left side is now turned forwards, and the left eye and zygoma are lowest in the pelvis, and the ecchymosis is found on this side, if the labour is protracted. The chin rotates upon the left anterior inclined plane, and the anterior fontanelle on the right posterior one: the same diameters correspond, and the labour is completed as in the first position. It is said that this position is more frequent than the former, and that rotation is more readily effected, as the rectum offers no impediment.

In all the various positions that have been described or alluded to, the object is to bring the chin to the pubis, and the mechanism is the same as in the two varieties above described. Should this fail, and the chin rotate into the hollow of the sacrum, it is impossible for this part to be born first (unless the fœtus be an abortion); for the thorax would then be in the pelvis at the same time as the head, and would require assistance to deliver it. These cases will be treated under *Preternatural Labour.*

Diagnosis.—Generally speaking, it is not difficult, although the face has been confounded with the breech. It is generally distinguished by the prominence and regularity of the features, by the nose, eyes, chin, and mouth; the latter is distinguished from the anus by the absence of the prominence of the coccyx, and by the sphincter ani; the best means of diagnosticating face presentations is by the bridge of the nose, which from its *crossing* the os uteri may be detected at a very early period of labour; it is better than the eye, which may not only be injured, but may mislead; it is better than the malar bones, for these may be mistaken for the tuber ischii, or even for the shoulder. The nose not only tells the presentation, but also the *position.* After the face has descended, the chin will confirm it.

Treatment.—Face presentations require more laborious effort for delivery than others, from the fact that the cephalic extremity is removed from the line of direction in which the uterus and accessory powers act. The second stage is also longer, because the bones of the face are incompressible, and there is not the same adaptation to the parts through which it is to pass.

In ordinary cases little is required beyond watching the case carefully, cheering and supporting the patient. If called early enough, endeavour to rectify the presentation; if not, to bring the chin to the pubis by the gentlest assistance. In most cases no interference is required; the general rules already given are sufficient. The features of a child born under a face presentation are generally much swollen, turgid, and livid. We must be prepared, therefore, to expect some disfigurement, which, however, will generally disappear in a day or two.

Other deviations from the vertex presentations sometimes occur from the operation of the same or similar causes. The head may descend half turned over, so that the occipito-frontal, or occipito-mental diameter corresponds to those of the straits, as shown before (p. 78). In this case either the anterior fontanelle or forehead will be the presenting part. Sometimes the head is too much flexed, occasioning a part of the nucha to present with the occiput. Again, it frequently happens that one of the parietal bones, or the ear, or the temple, being nearly parallel with the plane of the superior strait, engages first. Such cases may either correct themselves, or become the cause of preternatural labour.

PELVIC PRESENTATIONS.

Under the head of pelvic presentations are included those of the knees and feet; it matters but little, so far as the mother is concerned, which end of the fœtal oval presents at the superior strait, since either can be born unassisted. These pelvic presentations are, however, more dangerous to the child than cephalic, either from the fact that the placenta is often detached from the uterine surface before the head is born, or from pressure upon the umbilical cord during the exit of the head, either case being attended by the same result, viz.: *asphyxiation of the child.* All practitioners agree that the child is oftener born dead in pelvic presentations, than in those in which the vertex descends first.

Causes.—Breech labours occur once in about every forty-five or fifty cases; why they occur this often, or why they happen at all, appears to be inexplicable. Madame Lachapelle explains their occurrence as follows:—During a great part of gestation, and whilst the fœtus is still movable in the cavity of the uterus, its long diameter can be readily brought into coincidence with the transverse diameter of that organ; its position therefore is by no means fixed, and it can, by virtue of its active movements, present any part of its surface at the uterine orifice, but especially the cephalic or pelvic extremities. The latter part may occupy the superior strait at any period of gestation, in consequence of the movements of the fœtus, and may remain in that situation for an indefinite period. It happens then, if the fœtus in this time should have developed itself to any extent, it cannot turn, and it will be apt to retain the attitude it may then acquire till the end of pregnancy, as its length does not readily admit of its passing the transverse diameter of the uterus.* Violent movements on the part of the female, it is thought, may also be a cause of pelvic presentations, but, as before stated, they are in the great majority of cases, inexplicable. Some women, from original conformation or other causes, appear particularly obnoxious to this mischance, bringing all their children into the world by breech labours.

Prognosis.—Breech labours are generally more tedious than cephalic, inasmuch as the pelvic extremity is not so good a *dilator* as the cephalic; it never presents the same evenness, the same resistance, or the same rounded form as the head to the openings of the pelvis; it consequently acts to much less advantage on the cervix to finish its dilatation. In vertex presentations the most voluminous part, that which is best calculated to bear all kinds of pressure, escapes first. In pelvic presentations, on the contrary, the point of the cone advances first, so that the fœtus progresses more slowly in proportion as the labour advances.

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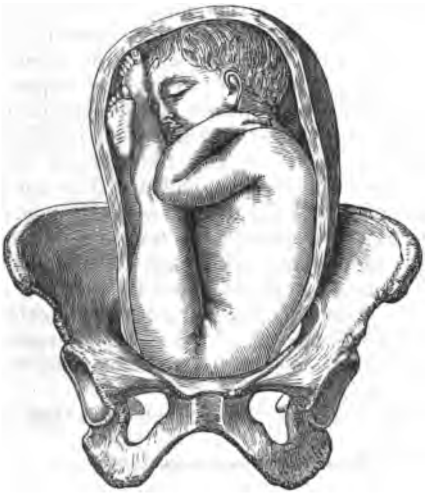
* Chailly, Traité Pratique de l'Art des Accouchemens, p. 604.

Positions.—The same difficulty occurs in enumerating the various positions of the breech that we have seen obtain in the other presentations, every author recording those which seemed to him best established. Thus some make as many as eight; among these is M. Flamant, who makes one for each extremity of the different diameters of the superior strait, viz.: two for the antero-posterior, two for the transverse, and two for each of the oblique, making eight in all. Others make six, corresponding to the different positions of the vertex, the sacrum taking the place of the vertex, as follows:—

1.	Sacrum to left acetabulum.	Post. part of thighs to right sac.-iliac junction.
2.	“ right “	“ left “ “
3.	“ pubes.	“ prom. of sacrum.
4.	“ right sacro-iliac junction,	“ left acetabulum.
5.	“ left “ “	“ right “
6.	“ to sacrum “ “	“ pubes “

We find, again, some reducing them to four, viz.: 1st, sacrum to the left acetabulum, 2d, to the right acetabulum, 3d, to the pubes, 4th, sacrum of the child to the promontory of sacrum of the mother. Thus the direct positions, either anterior or posterior, are possible, as well as the diagonal ones, and the breech *may* present in as many ways as the head.

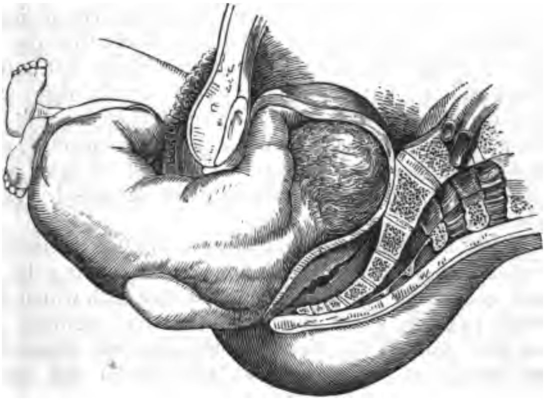
Fig. 25.



To simplify the matter, however, most of the recent writers reduce them to two, viz.: *sacro-anterior*, and *sacro-posterior*, that is, the back of the child towards the belly of the mother, and the back of the child towards the back of the mother. Not that the back of the child is *directly* anterior or posterior, but oblique, the transverse diameter of the child's hips corresponding to one or other of the oblique diameters of the superior strait. (Fig. 25.)

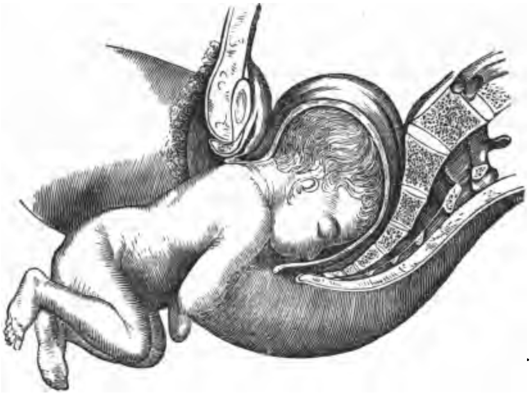
Mechanism.—The mechanism of the sacro-anterior positions is so much alike, that but one description will be given of them. Naegelé, on the mechanism of parturition, says, that "In every case, whether the nates have at first a completely transverse or oblique direction, they will be always found, on pressing lower into the superior aperture of the pelvis, to have taken an oblique position; and that ischium which is directed anteriorly, to stand lowest. In the most common position, where the sacrum of the child is towards the left acetabulum, as the breech descends into the pelvis, it is the left ischium that stands lowest, and is first touched by the finger. The child's left hip rotates forwards upon the right anterior inclined plane under the arch of the pubis, while the right hip slides backwards into the hollow of the sacrum along the left posterior inclined plane. As the shoulders are supposed to remain fixed in the uterus, flexion of the child's body takes place as it is being born, and restitution after the birth of the hips is effected. As the shoulders also engage obliquely, they undergo rotation, the left shoulder rotating on the right anterior inclined plane, and appearing under the pubis, while the right falls into the hollow of the sacrum (Fig. 26).

Fig. 26.



"But whilst the shoulders are descending in the above-mentioned oblique position, the head, with the chin resting upon the breast, presses into the superior strait in the direction of the right oblique diameter, that is, with the forehead at the right sacro-iliac junction, the occiput rotates upon the left anterior inclined plane, towards the pubis, and the forehead on the right posterior, into the hollow of the sacrum, and the head is born in such a manner, that whilst the occiput rests against the os pubis, the point of the chin, followed by the rest of the face, sweeps over the perineum, as the head turns on its lateral axis from below upwards (Fig. 27).

Fig. 27.



" There is no essential difference in the mechanism of the labour, when the sacrum is at the right acetabulum, except that the rotation is reversed; the right hip and shoulder rotate on the left anterior inclined plane, and the left hip and shoulder on the right posterior inclined plane; the occiput on the right anterior, and the forehead on the left posterior inclined plane. As before mentioned, when the sacrum is to the pubes, as it descends it becomes oblique, and then the mechanism is precisely the same as above described. (Figs. 26, 27 describe these.)

" As in positions of the cranium, the swelling of the integuments is chiefly met with on that parietal bone which, during the passage of the head, is situated lowest, and on that spot with which it enters the external passage, so in this case, the livid-coloured swelling appears on that part which, directed forwards, was situated lowest during the passage of the nates, and with which the nates were born."

In the second chief position, viz.: with the anterior surface of the child corresponding to the anterior abdominal parietes of the mother, or in other words, with the sacrum of the child to the sacrum of the mother, the same effect is produced by the expulsive action as before. The breech descends to the outlet of the pelvis; a slight turn is effected; one of the ilia (and it is generally the left) appears under the arch of the pelvis, the other traverses the perineum; the breech and legs escape, the shoulders pass the brim, and descend until they press upon the structures at the outlet; one escapes under the arch of the pubes, the other follows the curve of the sacrum, and the head is propelled into the cavity of the pelvis, with the face looking to one side, and the occiput to the other.

It might be supposed, from the position of the head at the commencement of labour, with the face looking forwards, that the *occiput* would fall into the hollow of the sacrum, and the *face* emerge under the pubes; but this is not the case; for when the shoulders are born, and the head is in the pelvis, the face is directed to one side or the other, exactly as in the sacro-anterior position; and a precisely similar turn is effected, the face falling into the hollow of the sacrum; so that the fœtus in its exit makes a semicircular rotation, the face being placed forwards at the commencement of labour, and being expelled through the outlet over the sacrum and perineum. Dr. Ramsbotham, from whom the above description is taken, says farther, "I believe that in no instance, if the case were left entirely to nature—provided the child and pelvis were of the common size and form—would the face be expelled under the arch of the pubis." Dr. Collins also confirms it. Dr. Naegelé mentions this last as a deviation from the ordinary mechanism of breech cases. He also describes another deviation, in which the chin departs from the breast, and the head enters the pelvis, after the birth of the body, with the occiput pressed against the nape of the neck, and the vertex corresponding to one or other ilium of the mother. As the head presses lower into the cavity, the vertex turns gradually more and more backwards, so that when the trunk is born, the arch of the cranium is directed to the hollow of the sacrum, and the inferior surface of the lower jaw to the symphysis pubis. In the birth of the head, whilst the under jaw presses with its inferior surface against the os pubis, the point of the occiput, with the vertex, followed by the forehead, sweeps *first* over the perineum; thus bringing the occipito-mental diameter into apposition with the antero-posterior of the outlet.

The *diagnosis* of breech presentations has already been given; it is not usually difficult. It may be confounded with the face, particularly where the labour has continued for some time, and the presenting part is tumid. It will be distinguished from the latter by the absence of the bridge of the nose, by the moveable, *single* point of the coccyx, by the contractility of the sphincter ani, by the tubera ischii, by the cleft between the nates, by its roundness and softness, and by the organs of generation. Of these, however, the point of the coccyx and the sacrum are the best, as the others may be so altered by swelling as not to be recognisable. The presence of the meconium is not a certain sign, since it is occasionally met with in cephalic presentation, where the child is subjected to strong pressure, though in the latter case, Dr. Collins says it is more fluid, from being mixed with the discharges from the uterus and vagina.

The *shape of the bag of waters*, is another diagnostic sign, being less hemispherical and more cylindrical than in vertex presentations, and more resembling an intestine in shape.

Auscultation, though not a certain test, is a corroborative proof; the sound of the fœtal heart will be heard higher in the abdominal region, if the head be at the fundus uteri, than if it be seated in its more natural position. The same is true of the *movements* of the fœtus, they being generally felt *lower* in the abdomen in breech cases, than in those in which the vertex presents.

Presentations of the breech, although perfectly natural labours, are generally more tedious for the mother, and more dangerous for the child than those of the head, for reasons already stated, viz.; that when, in pelvic labours, the head enters the pelvis, if everything be not favourable for its passing rapidly through it, the cord is so long compressed that the child is almost certainly lost.

Treatment.—Much more care and attention are required in the treatment of these labours, than in those before described; not only to protect the soft parts of the mother, but also to preserve the child's life, which is always placed in more or less danger. It is, therefore, of great importance that a correct diagnosis should be made early. Being satisfied that it is the breech which presents, the case requires no interference until the breech shall have been expelled through the external parts, further than to guard the soft parts of the mother, and carefully to support the perineum. Above all things, the attendant should not draw down the feet, as the inexperienced are too apt to do, in the hope of facilitating the delivery by having something to pull upon; this practice always diminishing the size of the dilating part, and thus *prolonging* the labour. As the breech escapes, it should be supported and carried upwards in the axis of the pelvis, allowing it perfect liberty to change its position or make such turns as the mechanism may require. Mechanical assistance is rarely required in these cases, the child *adapting itself* to the passages of the mother.

When the umbilicus appears at the external organs, the cord should be seized and gently drawn down and pushed to one side; this will prevent its being torn and pressed upon.

The *strength* of the *pulsations* in *the cord*, is the *best evidence we have* of the *necessity* for *any interference.*

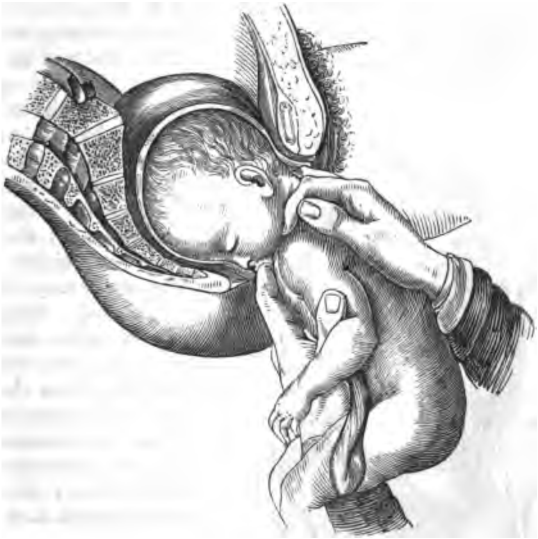
When the thorax has emerged, if the arms have not escaped with it, they should be brought down by passing one or two fingers over the shoulders, as near as possible to the elbow, and then drawing the arm *across the face* and *chest* until the elbow arrives at the external orifice; having delivered one, the other is easily extracted. It is generally better to deliver the one at the perineum first.

The slower the pelvis and body pass out, the quicker will the head pass, and the greater will be the chance of saving the child's life.

The body being born, it should be wrapped in warm flannel, and raised upwards on the practitioner's arm, to a height sufficient to enable the longest diameter of the head to become parallel with the axis of the vagina, and the patient urged to bear down.

If the head be delayed while in the vagina there is danger of losing the child; the extent of this danger will be estimated by the pulsation in the cord. As in most cases the head will be found with the face in the hollow of the sacrum, the delivery may be hastened by introducing one or two fingers of the left hand into the mouth, and depressing the chin upon the breast, at the same time carrying forward the body of the child. (Fig. 28.)

Fig. 28.

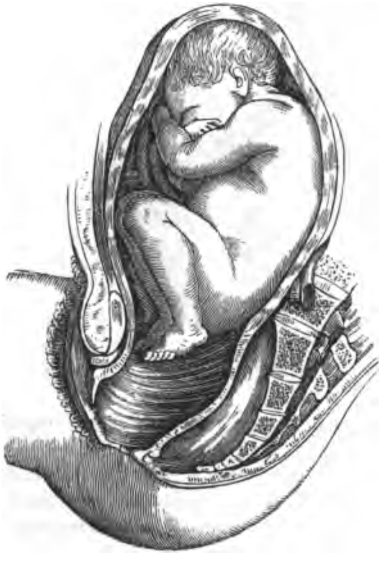


If this fail, the perineum should be pressed back so as to allow the atmospheric air to enter to the respiratory organs. The child, in this way, may be saved till the expulsive efforts effect the delivery. Should these means fail, and the child be in danger, the forceps should be at hand, and the child be delivered by their assistance.

If it should happen that the body is expelled with the face anteriorly, and the chin should lodge upon the pubes, it should be carried *backwards*, and the chin drawn down by the finger introduced into the mouth. The remainder of the delivery and the after treatment, are the same as in vertex presentations.

Presentations of the inferior extremities.—What has been said in relation to the danger of breech presentations, applies with even more force to those of the lower extremities. In this latter case the child may be compared to a *cone*, the apex of which presents itself first. Of course, under these circumstances, the pressure upon the child is constantly increasing as it descends, and the external parts not having been thoroughly dilated, when the body is born and the head engages, it is much more liable to prove fatal to the child in consequence of the detention that almost unavoidably ensues; the *prognosis*, therefore, in such cases is less favourable than in a *simple breech presentation.*—*Diagnosis.* Presentations of the feet may be readily distinguished. Before the membranes have ruptured, the bag of waters often protrudes in a more cylindrical form, or like the finger of a glove, and we discover that the presenting part is smaller than either the head or breech. At this stage we cannot readily distinguish whether it be the superior or inferior extremity that presents. After the membranes have ruptured, the *foot* will be recognised by its greater length, by the rounded instep, by the uniform length of the toes, by the absence of a thumb, and by the presence of the heel with the ankle bone on either side. The *knee* may be distinguished from the elbow, with which it is liable to be confounded, from the fact, that it is thicker, that it has two prominences, and a depression between them; while the elbow, which is thinner, presents, between the two prominences, a projection, in which it seems to end. (Fig. 30.)

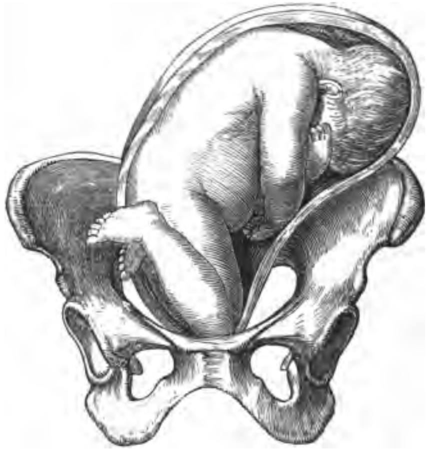
Fig. 29.



Positions of the feet, — Most accoucheurs enumerate *four* positions for footling presentations, viz.; 1st. Heels behind the left acetabulum, loins in front and to the left. 2d. Heels behind right acetabulum, loins forward and to the right. 3d. Heels behind the pubis, loins directly in front. 4th. Heels to the promontory of the sacrum. There are others who enumerate six, corresponding with vertex positions, and others again as many as eight, corresponding with those of the sacrum mentioned in the beginning of this article. (Fig. 29.)

Following the arrangement adopted in relation to breech presentations, we enumerate but *two*, viz : a *calcaneo-anterior*, and a *calcaneo-posterior*. 1st. When the heel is directed forwards and the toes backwards. 2d. When the heel is backwards and the toes forwards. The former is the more frequent, and both correspond to the two classes of breech presentations. (Fig. 30.)

Fig. 30.



The *positions of the knees*, have also the same varieties, the *anterior* parts of the leg corresponding to the sacrum and the vertex; and as they are commonly converted into footling cases, they do not require a separate description. (Fig. 30.)

Mechanism.—The feet meeting with no resistance to fix them, are liable to change their position during their descent until the hips enter the brim, which they do precisely as in breech cases; the mechanism, therefore, is the same, and does not require a further description.

Treatment.—The same rules apply to the treatment of presentations of the inferior extremities that were laid down in breech cases, with the additional caution, *not* to *yield* to the *temptation* to *pull down* the *feet;* the dilating part is already too small for safety, and if it be diminished by this procedure, the child will almost certainly be lost by pressure upon the cord during the descent of the head.

PRETERNATURAL LABOUR.

Preternatural labour, or *dystocia,* signifies a faulty, or irregular labour, the course of which is unfavourable, and in which the assistance of the obstetrician becomes necessary. It will be remembered that this definition applies to all cases of labour, without reference either to presentation or position, in which manual assistance becomes necessary.

According to Velpeau, the causes that render labour difficult, depend either upon the mother or the child. Some of them are unforeseen, or do not occur till the moment of parturition; the title of *accidental* may be appropriated to them. Others exist beforehand, and render the labour necessarily difficult; they merit the denomination of *pre-existing* causes.

The *accidental* causes are: any serious disease, such as inflammation of the brain or its coverings, the lungs, pleura, peritoneum, or uterus, &c., which takes place during labour; any hemorrhage sufficiently abundant to endanger the life of the mother, or her offspring; convulsions, syncope, laceration of the womb, the premature escape of the cord, hernia, aneurism, asthma, great debility, &c., and some positions which do not become bad until after the first pains.

The *pre-existing* causes are: deformities of the pelvis, malformation or disease of the organs of generation, calculus in the bladder, fibrous or other tumours in the excavation, deformities in respect to height, transverse positions, monstrous conformation and diseases of the fœtus.

As these different causes are in reality only complications of labour, it follows that *Dystocia* comprises all cases of complicated labour, as *Eutocia* comprehends all simple labours.

From the occurrence of any of the above-mentioned causes, one of the following operations may become necessary, to wit: *turning*, the *application of the forceps*, or *craniotomy*. The first of these most frequently becomes necessary in cases of transverse positions of the child, as in presentations of the shoulders. As the mode of proceeding is the same whenever the operation becomes necessary, it will be described only in cases of *shoulder presentations.*

PRESENTATIONS OF THE SUPERIOR EXTREMITIES.

In almost all cases of this kind it is the shoulder which presents itself at the superior strait, but it may happen that instead of a shoulder, a hand or elbow may be prolapsed; still, when they are advanced to a certain degree, it is the shoulder which fills the strait and presents the obstruction. The descent of the arm or hand add nothing to the difficulty; indeed it is rather serviceable, since it assists us in our diagnosis, and does not at all interfere with the successful termination of the labour. In this respect it differs from breech presentations, in which the descent of the feet is altogether to be avoided.

In all cases of shoulder presentation the back of the child either looks forwards towards the abdomen of the mother, or backwards towards the spine; the former is twice as frequent as the latter.

It need hardly be said, that in the majority of such cases, the delivery is impracticable except by art, although there are cases reported of what is called *spontaneous evolution*, in which the child has *righted* itself, the arm and shoulders receding, and the breech descending in its place, the labour being completed by the unassisted efforts of the mother.

Although spontaneous evolution *may* take place, it is more conformable to the dictates of prudence and humanity to turn the child, and bring down the feet, or restore the head to its proper place.

Causes.—There have generally been enumerated but two great presentations, viz., the *cephalic* and *pelvic*, all others are but deviations from these. As footling and knee presentations are deviations from the breech, so are those of the shoulder from cephalic. Various causes have been enumerated; among them are particular positions of the mother's body, inclination of the womb or of the straits of the pelvis, sudden and irregular movements of the fœtus, irregular early contractions of the womb, and irregular distension. Dr. Rigby concludes that the causes of arm or shoulder presentations are of two kinds, viz., when the uterus has been distended by an unusual quantity of liquor amnii, or when, from a faulty condition of the early pains of labour, its form has been altered, and with it the position of the child.

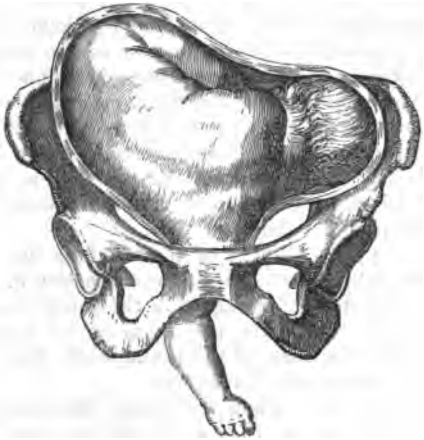
Dr. Meigs looks upon obliquity of the womb as the great cause. When the fundus falls over to either side, the action of the uterus is oblique, the head, instead of engaging in the superior strait, strikes against the brim of the pelvis, and glancing off from thence, is turned upwards into the costa of the ilium, while the shoulder descends or engages in the superior strait.

Diagnosis.—It is only when the labour has commenced, and indeed made some progress, that a shoulder presentation can be positively detected. It may be *suspected*, if we are unable to reach the presenting part, if the os uteri, though flaccid, opens slowly, if the bag of waters is cylindrical, or like the finger of a glove, and if the uterus ceases to act after the membranes have been ruptured for some time. We can only *positively* detect the presentation by distinguishing the different parts of the child, as, for instance, the spinous process of the scapula, the clavicle, the round-shaped shoulder, the axilla, the ribs, the arm, and in some cases the hand when prolapsed, distinguished from the foot by the means already pointed out. The aspect of the palm of the hand will mark whether it be the right or left. The diagnosis between the *breech* and the *shoulder* will be easy, if the distinguishing marks of the former are remembered.

Positions.—There are two positions for the presentation of each shoulder, viz., a *first* and *second* for the *right shoulder;* and a *first* and *second* for the *left.* In *both* the first positions the head is on the left of the mother, and in both the second, on the right. As shoulder presentations are deviations from *vertex* presentations, the *first* positions are the most common. These positions are called the *dorso-pubic* and *dorso-sacral* of the right, and *dorso-sacral* and *dorso-pubic* of the left shoulder.

Right Shoulder.—First position, right dorso-pubic.—The head of the child is to the *left* of the mother, the *back* of the child is towards the *front* of the mother (dorso-pubic), and the *face* of the child with its toes and feet look towards her back. (Fig. 31.)

Fig. 31.



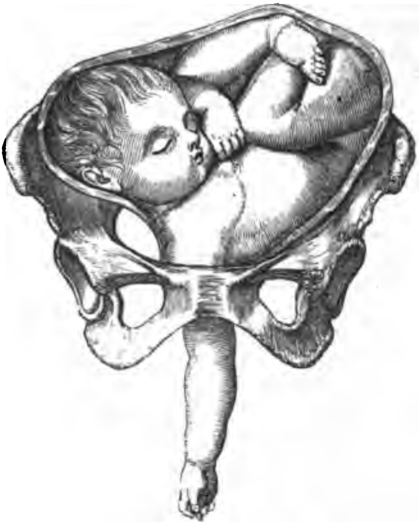
Second position, right dorso-sacral.—The head of the child is to the *right* of the mother, the *back* of the child towards the *back* of the mother (dorso-sacral), and the *face* and *front* of the child look towards the front of the mother. (Fig. 32.)

Left shoulder, left dorso-sacral, First position.—The head is on the *left*, the *face* and *front* of the child look forwards, and the *back* is to the back of the mother (dorso-sacral of the left).

Second position, left dorso-pubic.—The head is to the *right*, the *face* and *front* of the child look backwards, and the *back* is towards the front of the mother (dorso-pubic of the left).

Treatment.—Having ascertained that the case is a *shoulder presentation*, the indications are to deliver by the operation of *turning*, or *version;* by which is understood "the act of turning the child

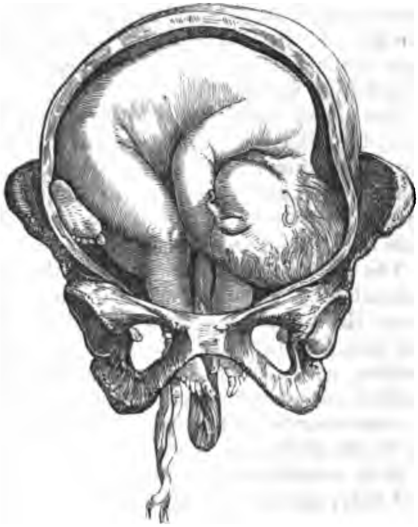
Fig. 32.



with the hand, and bringing one of the extremities of its great diameter to the superior strait." (Velpeau.)

There are three varieties of this operation described by obstetrical writers: *First, Version by the head,* in which the presenting part is pushed away, and the head substituted for it; the remainder of the labour being left to nature. *Second, Version by the breech.*—Where the pelvic extremity of the child is substituted for the presenting part, and the case converted into a *breech labour. Third, Version by the feet,* in which the hand is introduced into the cavity of the uterus, one or both feet seized and brought down, causing the child to make a complete evolution, and extracting it footling. (Fig. 33.)

Fig. 33.



The first and second methods, although safest for the child, are rarely employed, in consequence of the difficulty of seizing and moving the parts mentioned into a more favourable condition. The third is the mode of practice generally adopted, and although more dangerous to the child, it is safest for the mother, since it gives the attendant more complete control of the case. It is the mode of delivery now almost universally adopted, both in this country and Europe.

Method of Procedure.—The operation ought never to be attempted till the os uteri is *dilated*, or *dilatable;* the fittest moment is when the os uteri is *fully dilated* and the *membranes unruptured.* If the os uteri is rigid and unyielding, the proper means of relaxing it should be first adopted; the rectum and bladder should also be thoroughly evacuated, and the *position* carefully ascertained.

The patient should be placed in the position most convenient to the operator; some recommend that on the back, with the hips on the edge of the bed, and the knees supported by assistants; some on the hands and knees; others prefer the ordinary position on the left side. The *choice of the hand* depends on the position: the rule is, *use that hand whose palm, when opened in the cavity of the womb, looks towards the abdomen of the child.* Some recommend the use of the right or left hand, according as either is most convenient. It should be well oiled on the outside, and introduced in a conical form, into the vagina, during a pain; it will then be ready to enter the os uteri as soon as the pain goes off. The presenting arm is never an impediment, and should not be removed.

When the membranes remain unruptured, the hand should be gently insinuated between them and the uterus, until the feet (or *one* foot) are found, always stopping and opening the hand on the accession of a pain.

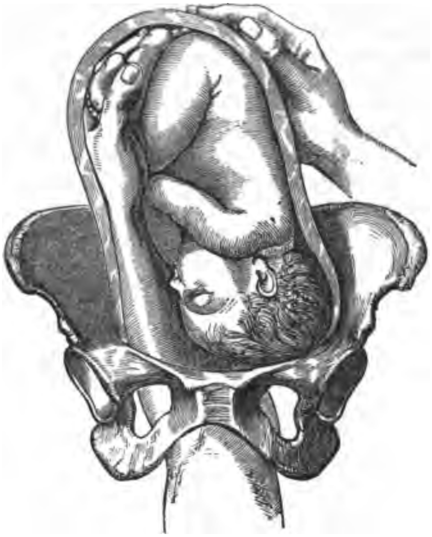
Be certain that it is a foot that is seized. *Now* rupture the membranes and draw the feet, or foot, with a waving motion, slowly into the pelvis. By this method the liquor amnii is retained, the uterus kept distended, and the child turned with as great facility as in a "bucket of water."

The act of turning should be accomplished during an *interval* of pain, thus the danger of rupturing the womb will be avoided. External pressure with the unoccupied hand favours the version very considerably, and should never be neglected. In turning, the feet should be brought over the *front* of the child, and not over the back, thus avoiding dislocation of the spine.

The *extraction* should be accomplished *during* a pain, always remembering the axis of the pelvis, and being careful not to place the fœtus in a wrong position, but endeavouring to make the face fall into the hollow of the sacrum. The case is now a footling one. When the membranes are ruptured, and the waters drained off, additional care is necessary not to *force* the uterus, but to endeavour to promote relaxation by the proper means, and above all to use gentleness in overcoming the contractions.

It is considered advisable by some practitioners to turn by *one* foot only, inasmuch as the breech with the thigh turned up, is more

Fig. 34.



bulky than the hips with the thigh extended; the passage will be better prepared to admit the quick transit of the child's head, upon which the safety of the infant depends. After the case has been converted into a footling, it should be treated as though it were so originally, that is, left as far as possible to the natural expulsive powers.

Version in cephalic presentations, is accomplished by the same method of proceeding: the same rules applying for the choice of the hand, &c., as in shoulder presentations. This operation sometimes becomes necessary in hemorrhages before delivery, either accidental or unavoidable; convulsions; prolapsus of the cord; syncope; &c., thus converting what would otherwise have been a natural, into a preternatural labour. (Fig. 34.)

When the operation of turning is entirely impossible, it may become necessary to deliver the mother either by *exvisceration*, or *decapitation*.

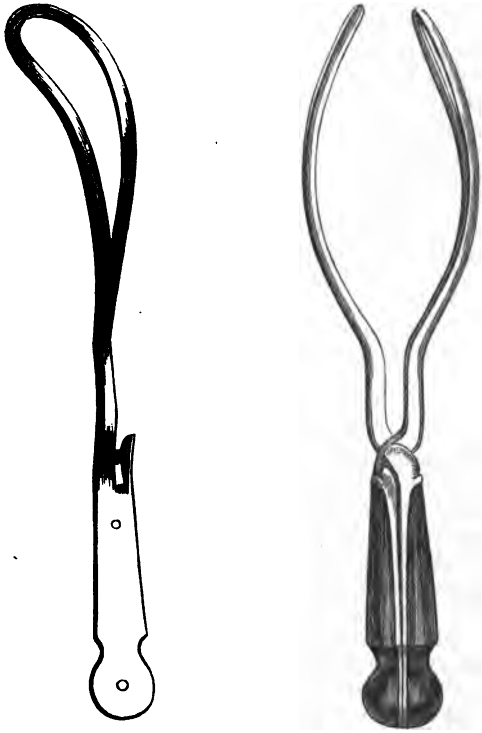
THE FORCEPS.

It would be manifestly out of place, in a work of this kind, to enter into a detailed history of the forceps. Suffice it to say, that although hinted at by the ancients, we find no record of their discovery or application, till the beginning of the seventeenth century, when Dr. Hugh Chamberlayne published a translation of Mauriceau, in the preface of which he declares that his father, brother, and himself, "have, by God's blessing and our industry, attained to, and long practised, a way to deliver women without any prejudice to them or their infants." "By this manual operation, a labour may be despatched (in the least difficulty), with fewer pains, and sooner, to the great advantage, and without danger, both of woman and child."

The merit of the discovery, therefore, seems to rest with Dr. Paul Chamberlayne, by whom and his sons it was kept a profound secret, till about the year 1715, when it was made public. Since that time, the instrument has undergone various modifications, always, however, retaining the general form originally given to it. The English generally prefer the short forceps, the French and German the long. In this country the long forceps are most generally used.

The forceps are intended for the extraction of the child's head, *and nothing else.* They possess the twofold power of, 1st, grasping and slightly compressing the child's head; 2d, that of acting as a lever of the first kind, and as an extractor. They are to be applied to no other part of the child's body than the head, and are not designed to be used in cases of premature delivery, or where the head is larger than natural from abnormal growth.

Fig. 35.



This instrument consists of two branches or pieces, one intended to be used by the right hand, and the other by the left. The first is called the *right hand* blade; the second, the *left hand* blade, or branch. Each branch consists of three parts, viz.: the blade, or clam, the lock, and the handle; in some instruments the handle terminates in a blunt hook. The clam or blade, ought, if possible, to be applied to the side of the child's head, and not to the face or vertex, and should extend from the vertex to the chin. It is provided with an open space called the *fenestra*, which not only renders the instrument lighter, but enables it to be more accurately applied to the sides of the head. The *lock* consists either in a *pivot* in one branch, which is called the male blade, and a notch in the other, called thence the female blade, which is the German lock; or a notch in the upper surface of the left, and in the lower surface of the right branch, which is the English lock.

The original forceps (and at this day, many of the English forceps) were *straight* in the direction of their length; that is, they had only one curve, that which applied itself to the child's head. Drs. Smellie and Levret, both about the same time, gave to the blades a new curve on the edges, so as to adapt them to the axis of the pelvis. This modification is therefore often spoken of as the "*New curve.*" (Fig. 35.)

The "*eclectic forceps,*" as modified by Professor Hodge, of the University of Pennsylvania, combines the advantages of both the long and short forceps. Fig. 36 represents them: *a*, lock; *b*, blunt hook at end of handle; *c*, *d*, clam; *e*, *f*, the fenestræ.*

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* The following description of this modification of the forceps, is given by Dr. Hodge himself, in a communication to Professor Huston: "The great object of the forceps is to extract the head of the fœtus from the mother's organs, in suitable cases, without injury to the mother or child. It is notorious that injuries to one or both parties frequently result, exciting a too well-founded dread of this instrument in the minds of females, and even of physicians. Many causes contribute to this unfortunate result. No doubt much depends on the size, weight, and especially on the form of the instrument employed, a fact confirmed by the almost innumerable varieties which have been suggested. The instrument, as heretofore used, is evidently imperfect; and the one now suggested, is presented under the impression that, while it maintains all the excellencies of the former varieties, the injurious influences are partly, if not wholly, avoided. It is a modification of the long French forceps, but may be well termed an eclectic forceps, as combining, as much as possible, the peculiar excellencies of the English, German, and French varieties.

"The advantages of the French or long forceps are, I think, many and decided, as 1st, by them, any operation pertaining to this instrument, can be performed. There is no necessity to vary the form, structure, or size, of the instrument, whatever may be the presentation of the head, its position, or its location. 2d. By them, sufficient power can be applied in cases of necessity, which cannot be done by the short forceps. Their leverage is greater. 3d. The narrowness of the blades, which, without detracting from the utility of the instrument, will allow of their application to the sides of the head, even in oblique and transverse positions. Many of the modern English forceps, are too broad to allow the proper manipulation of the instrument in the cavity of the pelvis. They cannot be introduced through the vulva without pain, especially in first labours. The French forceps can very generally be applied without pain.

"4th. It may be added as another advantage, that as habit in the use of an instrument is all-important, the practitioner will sooner become accustomed to a forceps which he can employ on all occasions, than when he is obliged to vary it continually; especially when it is remembered that among the strong and well-formed females of America, cases for the forceps are not very numerous in the circle of any practitioner.

Indications for their Use.—The forceps are indicated, 1st, where nature is unable to expel the child, either from a want of sufficient power, or when the labour is arrested by certain malpositions of the

"The disadvantages, which experience has taught me to arise from the French forceps, are—

"1st. Its unnecessary weight.

"2d. The pelvic curve, in the variety most in use in this country, is not sufficiently great. Hence when the head is high in the pelvis, the perineum will be too much pressed upon, or else the blades will be applied in the direction of the occipito-frontal or longitudinal diameter, instead of the occipito-mental or oblique diameter.

"3d. The divergence of the blades commencing at the joint must necessarily distend the vulva (especially its posterior margin) prematurely, and when the head is high up, gives pain and endangers the laceration of the perineum.

"4th. The small size and kite-like shape of the fenestra prevent any portion of the cranium, even of the parietal protuberances, projecting into their openings: hence the hold on the head is less firm, and space is occupied by the blades, the thickness of which is added to the transverse diameter of the head.

"5th. The flatness of the internal or cephalic surfaces of the blades—so that the margin of the fenestra, often measuring three-eighths of an inch, is much thicker than the external edge of the blade—increases the space occupied by the instrument. Hence in cases of difficulty, where compression is employed, contusion or even wounding of the scalp results.

"6th. The mode of junction of the French forceps is decidedly inconvenient when compared with the English, and especially with the German mode.

"These disadvantages I have endeavoured to obviate without diminishing or circumscribing the utility of this most valuable instrument, to which the profession and the public are so much indebted. My experience encourages the hope, that the attempt has been in a very great degree successful, so that even in inexperienced hands, the dangers of the forceps have been materially lessened.

"1. The weight of the instrument has been diminished from twenty ounces, avoirdupois, to seventeen ounces.

"2. The pelvic curve has been slightly increased, so that the perineum may not be dangerously pressed upon when the blades are in the axis of the superior strait. To counteract any loss of power which may ensue from the increased curvature, there is an angular bend in the handles, in an opposite direction, that the direct line of traction may be preserved, a suggestion of our skilful and experienced instrument-maker, Mr. Rorer.

"3. The shanks or commencement of the blades are nearly parallel, diverging no more than is absolutely necessary, until they approximate the head of the child, when a more rapid curvature, than in the Levret forceps, occurs.

"4. The proper blades of the instrument, from the shanks to the extremities, are nearly of the same breadth throughout, being equal to that of the extremity of the French forceps.

"5. The advantages are a more secure hold of the head, and especially allowing larger fenestræ, so that the parietal protuberances may project into the openings, and no space be occupied by the blades, when properly applied.

"6. The cephalic surface of the blade is concave, so as to be adapted to the convexity of the head, as suggested by Dr. Davis in his improved forceps, hence no edges touch the scalp, and there is no wounding of the tissues, even when great compression is made.

"7. The very ingenious and scientific mode of locking the blades, as in the German or Siebold's forceps, by means of a conical pivot, and the corresponding oblique conical opening for its reception, is adopted, by which all the facilities of the English junction are enjoyed, and the security and firmness of the French joint are maintained.

"The eclectic forceps weighs one pound and one ounce, being nine ounces lighter than the French forceps, as usually manufactured by Rorer, of this city, and eleven ounces lighter than a specimen of Dubois forceps in my possession, made in Paris.

"The whole length of the instrument (see Fig. 36), in a direct line from *b* to *c*, is 16 inches; from the joint *a* to the extremity *b*, the length of the handles is 6·8; from *a* to *d*, length of parallel shanks is 3·5; from *d* to *c*, the proper blades in a direct line, is 6 inches; from *c c*, the extremities, to *e f*, the greatest breadth, 3·7 inches.

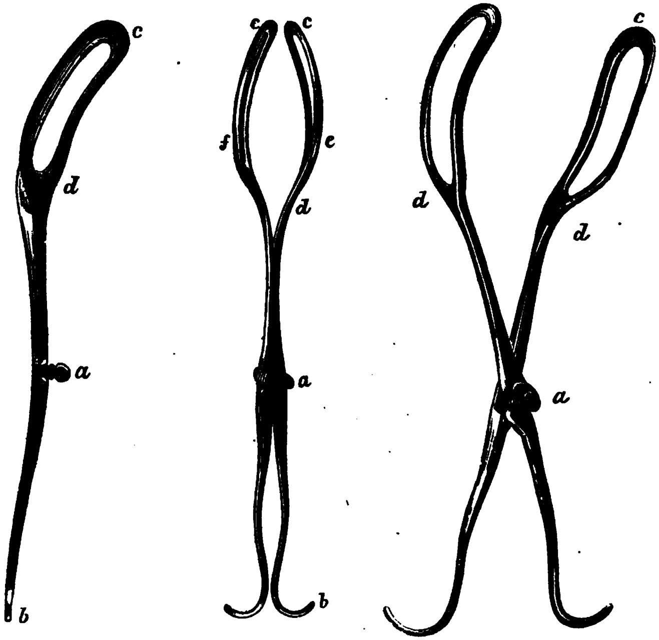
"The separation between the points *c c*, when the handles are in contact, is ·5 of an inch; from *e* to *f*, the greatest breadth when the handles touch, is 2·5; when the separation at *e f* is 3·5, the points *c c* are separated to 2 inches; the breadth of the blade is 1·8, slightly tapering to 1·7 near *c c*, the extremities. The breadth of the fenestra is 1·1; the thickness of the blade is ·2 of an inch. The perpendicular elevation of the points *c c*, when the instrument is on a horizontal surface, is 3·4 inches, which indicates the degree of curvature of the blade.

"The elevation of the handles near the joint, above the same horizontal line, is 1·3 (including the thickness of the blades), which indicates the extent of the angular bend in the handles."

A careful perusal of these judicious remarks of Professor Hodge, will impress the student with the advantages of the eclectic forceps, and will render any farther description of this instrument unnecessary.

head at the brim, or in the cavity of the pelvis; 2d, whenever the labour becomes dangerous for mother or child, and where the danger can only be removed by hastening the labour.

Fig. 36.



It is meant, when the *forceps* are used, to supply with them the insufficiency, or want, of labour-pains; but, so long as the pains continue, there is reason to hope they will produce their effect, and therefore justify waiting.

The first stage of labour must be completed, that is, the os uteri must be dilated, and the membranes broken, before the attempt is made to apply the forceps. They are never to be used as *dilators*. Care must be taken, however, that, from an aversion to the employment of instruments, their use is not too long delayed, and thus the benefit to be derived from their application be entirely lost.

The most favourable case for their application is, where the head is at the inferior strait; the nearer the head is to the external organs, the more readily may the instrument be adjusted to it, especially if *rotation* have taken place. It is very rarely, if ever, necessary to apply them, where the head has not yet passed the superior strait.

The forceps should always, *if possible*, be applied over the ears of the child; it is a good rule, therefore, always to find this part, before proceeding to apply them.

Method of Application.—Having determined to apply the forceps, the same general rules should be observed as in turning, viz.: evacuate the bladder and rectum; draw the patient to the edge, or side of the bed, having previously protected it from injury, and place her either on her back with the feet supported, or as the English practitioners prefer, on her left side. The necessity and nature of the operation should always be explained to the patient or her friends, before proceeding to its performance.

The instruments should always be warmed and well anointed before using them, and some mild unguent should also be applied to the external organs, and the patient protected from exposure, by a sheet or blanket thrown over her. The great importance of a *precise* knowledge of the *position of the head* should be impressed upon the mind of the practitioner, before commencing this operation.

Which blade must be introduced first?—In this country and on the continent, where the long curved forceps are used, very explicit directions are laid down for the choice of the blade. In England, where the short straight forceps are employed, it seems to be a matter of indifference which is applied first, the general directions being to apply that blade first, the lock of which looks forwards. The following directions, therefore, apply to the use of the *long curved forceps.* Let the student remember, in the first place, that the forceps are to be applied perpendicularly to the transverse, and parallel with the occipito-mental diameter of the child's head. As a general rule, the *left hand*, or *male blade*, should always be introduced *first.*

Occipito-anterior position, where the vertex presents and rotation has taken place. The left hand, or male blade, is to be taken in the left hand as a writing pen is held, two or three fingers of the right hand are to be introduced between the left side of the vagina and the child's head, so that their extremities may touch the os uteri; the handle of the instrument is first raised up high in front of the woman's right groin, so as to bring the other extremity in the line of the axis of the vulva, into which it is next gently and slowly introduced *in the interval between the pains;* in proportion as it enters, the handle is by degrees brought from above downwards, and from right to left, towards the median line. The point of the instrument must be kept carefully in contact with the child's head, and *no force* used in the introduction. It is thus moved onwards, making it follow the left posterior inclined plane, gradually depressing the handle until the instrument has been placed by the side of the child's head in the direction of the occipito-mental diameter.

The handle is then to be given in charge of an assistant, and the *right hand*, or *female blade*, to be taken in the right hand in the same manner as before, while the fingers of the left are to be introduced between the right side of the vagina and the child's head. Upon these, as the guide, the blade is to be introduced as before described, gradually depressing the handle till it comes in contact with and crosses the blade first introduced; the two are then to be locked, and the adjustment is completed. Care should be taken that nothing be entangled in the lock of the forceps, by carrying the finger round it.

Should the handles of the forceps, when applied, come close together, probably the bulk of the head is not included between them, and therefore, when we acted with them, they would slip.

If the handles, when locked, are at a great distance from each other, they are not accurately applied, and will probably slip. Allowance should be made, however, in these estimates, for the different dimensions of the heads of children. When the instrument is thus adjusted, a slight compression, and traction should be made in order to be sure the soft parts of the mother are not included in the grasp (which is known by her complaints), and also to bring the instrument to its proper adjustment on the child's head.

As soon as a pain comes on, begin the extraction by slowly moving the forceps from handle to handle, thus causing them to act as double levers, exerting at the same time sufficient extractive force to prevent the opposite blade from slipping deeper into the organs, while the handles are moved to the right, or to the left.

Great care should be taken to support the perineum as the vertex emerges, and at the same time to carry the handles of the forceps upwards, towards the abdomen of the mother, causing the head to execute the same movements, as though it were expelled by the natural pains.

The woman should be allowed intervals of rest between the extractive efforts, precisely as in a natural labour, unless there be some pressing exigency for her rapid delivery; at the same time the hold upon the forceps should be relaxed, so as to remove the pressure from the head.

When the head is born, the forceps should be removed, and the labour completed by the natural powers of the woman.

In the operation just described, that is, after rotation has taken place, when the forceps are adjusted, the lock looks upwards, and the concavity of the new curve is directed towards the symphysis pubis, while the convexity coincides with the hollow of the sacrum. In every application of this instrument, the general rule is that the *concave edges should look towards the pubes, and the convex towards the hollow of the sacrum.*

In the *first position, before the rotation has taken place,* the same general rules are to be observed in the introduction. When the blades are locked they are inclined towards the left thigh, and the lock looks upwards and to the left. The same rule of traction is to be observed as before; the rotation will take place as the head advances.

In the *second position,* the adjustment is not so easy, because after the introduction of the first blade, it occupies so much of the anterior commissure of the vulva as to leave insufficient space for the introduction of the second. To obviate this, after the first, or male blade is introduced, retract it a little till it is opposite the left ischium, then give it in charge of an assistant, and introduce the female blade to its proper position; now pass the male blade up to its position under the ramus of the left pubis, and lock as before; the handles will point towards the right thigh, and the lock will look upwards and to the right. Make traction as before.

In the *occipito posterior* positions, the forceps ought to be introduced and fixed as in the former positions, only the handles must be much more depressed, and the perineum thrust back, so as to allow them to adapt themselves to the occipito-mental diameter.

If rotation has taken place into the hollow of the sacrum, as the vertex must escape first, the first movement in extraction should be to raise the handles up a little, so as to increase *flexion;* then as the vertex escapes over the perineum (which is greatly distended in this operation, and should be carefully guarded), they should be *depressed,* so that the head may extend itself backwards, as it always does in these labours. The rest of the process is completed as in natural labour.

In the *fourth* and *fifth* positions, where rotation has not taken place, the application is more difficult; the blades rather seize the head in its vertical diameter, and are brought into parallelism with the oblique as the extraction proceeds. The introduction must take place as in a first or second position, the fifth corresponding to the first, and the fourth to the second. In these positions the forceps ought to be so placed, that the concave edge may look forwards, and it is allowable to rotate the vertex into the hollow of the sacrum, provided all hope of bringing it to the pubes has failed.

There is one position of the child's head in which it is recommended to introduce the *right hand,* or *female blade* first, viz., the *left occipito-iliac,* according to Velpeau, where the head is transverse, the occiput at the left ilium, and forehead at the right; the right hand blade is to be introduced first, and conducted with care in front of the right sacro-iliac junction, as high up as the forehead; then by the assistance of the fingers of the left hand, placed under its convex edge, and in concert with the right hand, move it from behind forwards, and from right to left, until its concave edge is turned towards the left iliac fossa, and the blade has arrived upon the right parietal protuberance. The handle, strongly depressed, is then given to an assistant, who holds it against the woman's left thigh.

The left branch is held in the left hand, and passed up along the posterior part of the pelvis, until its point is above the superior strait, and the pivot even with the mortice that is in the other branch. After having joined them, and dislodged the head, if it be still in the superior strait, and forced the occiput to descend into the excavation, provided it were not already there, the concave edges of the instrument are gradually brought to the front, and the remainder of the operation is conducted as in the occipito-pubic positions.

Dr. Meigs describes a similar operation, when the head is transverse, but lower in the pelvis, with the vertex resting on the left ischium, and the forehead on the right.

"When the instrument has grasped the head in this position the handles will project very much towards the left thigh in abduction; but if we introduce the male blade first, inasmuch as its handle will project towards the left thigh, it will occupy all the space on that side, and prevent the insertion of the second branch, for there is no place in which to depress the handle. To avoid this difficulty, take the female blade in the right hand, and introduce it into the posterior and right side of the vagina, causing its point to sweep over the face to the right side of the head, behind the pubis, leaving the handle to project towards the left thigh. Next take the male blade into the right hand, and turning the concave edge of the new curve downwards, insert the point into the right side of the vagina below the female branch. Let the fœtal face of the clam apply itself to the convexity of the head, and slide it onwards, and in proportion as it enters, make it sweep round the crown of the head towards the back of the pelvis. In effecting this, the handle comes gradually down as the clam gets on the left side of the cranium, and at last the lock is found where it ought to be, viz., under the upper or female blade, with which it is then locked."

Having ascertained that the head is properly grasped, the attempt may be made to rotate it, and the latter stage of the operation will be the same as already described.

Right occipito-iliac position.—The only difference between this and the left occipito-iliac position is in the application of the forceps, in doing which the left blade is applied first.

The forceps are sometimes necessary in *face presentations*. In these cases they may be applied to the sides of the head, as in the preceding. In those examples in which the chin comes to the pubis, the method of application is the same as when the vertex is at this point; but in those in which the forehead is at the pubis, the handles must be very much depressed at first, as well as in the occipito-posterior positions; as the case proceeds they must be strongly elevated, so as to draw the chin down to the fourchette, over which it must slip. As soon as the chin is free the handles must be allowed to descend again, whilst the traction is continued until the head is born.

In cases of *locked* or *impacted head*, instead of applying the forceps to the sides of the head, one blade is passed over the face, and the other over the vertex, for this reason: it generally happens when the head is thus locked, it is in its transverse, or bi-parietal diameter, one parietal protuberance being held at the pubis, and the other at the projection of the sacrum; there is not space enough, therefore, at these points to admit the blades, and if they are to be applied to the head, it can only be on those parts that are free from great pressure, as the face on one side, and the occiput on the other. After applying the forceps in these cases, they should be well pressed together, to prevent their slipping when the traction effort is made. The motion from handle to handle, assisted by the traction, will generally be sufficient to disengage the head, after which the forceps should be removed.

Lastly, in pelvic presentations, when the trunk is delivered, and the head detained, the method of proceeding is as follows: if the face is in the hollow of the sacrum, the body, wrapped in a napkin, should be raised upwards, and held in a position nearly perpendicular; then the left branch is introduced and applied to the head, from the chin to the vertex, afterwards the right is adjusted, following the same rules as when the heads descends first.

If, however, the *occiput* is in the hollow of the sacrum, and it cannot be turned to the front of the pelvis by manual assistance, the child should be carried back over the perineum as far as can be done with safety to its neck, and the forceps introduced in front of its body, as before. In extracting the head, we should endeavour to act with such force as to cause the chin and forehead to emerge under the arch of the pubis.

In all cases the trunk is to be turned towards the direction in which the occiput looks, and the forceps introduced along the sides of the head, in such a way that the concavity of its edges may be towards the front, or brought there in the progress of the operation.

Under whatever circumstances the forceps are applied, the extraction should always be performed in the line of the axes, and always *with gentleness.*

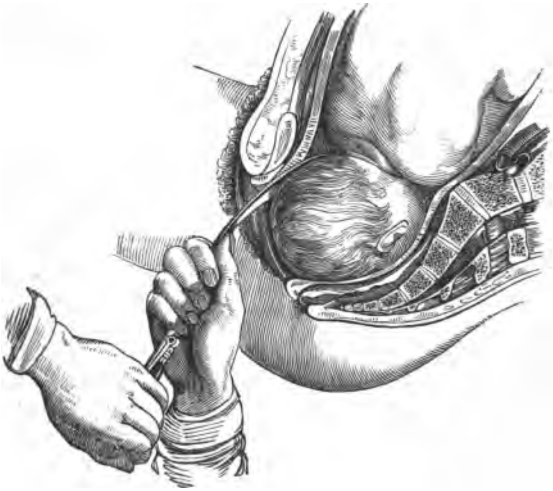
THE VECTIS, OR LEVER.

A just idea of this instrument will be had, by considering it as one blade of the *forceps*, a little lengthened and enlarged, with the handle placed in a direct line with the blade, that is, without any lateral curvature.

The general conditions and circumstances of labour before stated as requiring and allowing the use of the forceps, will hold equally good when the vectis is intended to be used. Three modes of using this instrument have been suggested; either as a lever of the first order, or as an antagonist to the left hand introduced into the pelvis, or as a simple tractor: the last is considered the only safe method. If used as a lever of the first kind at all, the fulcrum should be made by the hand of the accoucheur, and *not by the soft parts of the mother.*

In the second method, it is evident that if there be sufficient room in the pelvis for the introduction of the fingers of the left hand, there can be but little necessity for instrumental assistance.

Fig. 37.



In the third method, that proposed by Dease, of Dublin, the instrument is introduced as a single blade of the forceps would be, the point is carried fully over the child's head, and the handle grasped tightly, and held firmly by one hand, while the shank of the instrument is embraced by the other, and a movement, that of steady traction downwards, should be given by that hand which embraces the shank, thus converting the instrument into a lever of the *third* order. (Fig. 37.)

The same posture and preparatory arrangement of the patient should be made, as in forceps cases; and in the same manner, the traction is to be made during a pain. This instrument may be used to correct malpositions, and to assist rotation and flexion.

THE FILLET OR NOOSE, AND BLUNT HOOK.

The first consists of a strip of strong cloth, silk, or leather, formed into a running noose, and intended to be introduced over the head in whatever way can be most easily accomplished; and this done, the loop is tightened, and extraction effected by main force. Its use is now discarded in head presentations. Some persons, however, still make use of it to effect extractive force upon the ham, groin, or axilla; but, as the *blunt hook* answers a better purpose, and is more easily applied, it is now rarely used, except to confine the hand in shoulder presentations, where turning is necessary.

The *blunt hook* is applied to the groin in breech cases, or to the axilla where the shoulders are delayed; it is also sometimes used to produce flexion in breech cases, when the body is born and the head detained. In these cases it may be tried first in the mouth; if that fail, it may be fixed upon the lower edge of the orbit.

CRANIOTOMY.

This operation is demanded at times on account of either mother or child; on account of the mother, in consequence of deformed pelvis; on account of the child, in consequence of the disproportionate size of the head, tumours of the chest or abdomen; or both these conditions may occur at the same time.

Uniform smallness of the pelvis, or contraction of its brim, or of any part of its cavity or outlet, are, of course, most serious obstacles to labour. Unless timely aid be given, not only may the child be destroyed, but the mother's vital powers may be exhausted, in ineffectual parturient efforts, and the most serious consequences result to the soft parts, from the long-continued pressure upon them, such as sloughing, apertures from the vagina into the bladder or rectum, and other accidents, rendering her miserable for life.

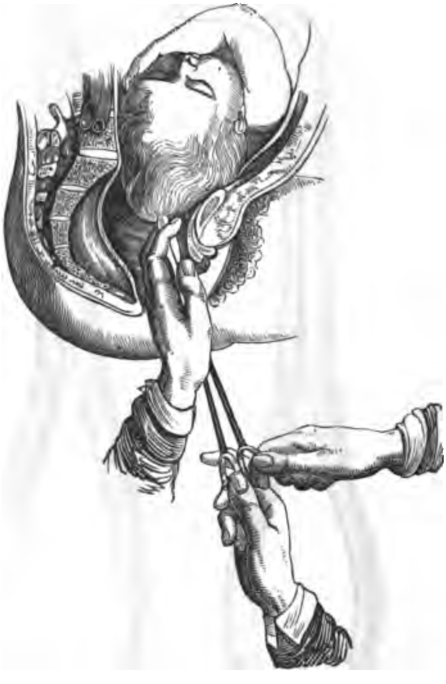
Care should be taken, therefore, never to delay assistance until the woman has become exhausted. Shivering, or vomiting, dry brown tongue, and a pulse above 100, show a necessity for active interference.

The object of the operation of craniotomy is to terminate the labour with safety to the mother in cases where, from the disproportion between the size of the fœtal head and the pelvis, a living child can neither be expelled by the natural powers, nor extracted by the forceps; it being always understood that *the distortion is not so great as to prevent the extraction of the child when mutilated.*

According to most authorities, whenever the bones of the pelvis approach much nearer to each other than three inches in the antero-posterior diameter, it is unequal to the transmission of the skull entire; and unless there be at the superior strait an antero-posterior diameter of an inch and a half with a transverse of three, it would be useless to attempt to deliver *per vias naturales*, even after the head has been reduced in size.

In some cases, where the sutures are very loose, the evacuation of the brain is often sufficient, as the bones of the cranium collapse so much by the pressure of the womb that the child may be expelled by the natural powers. But it is presumed in this case, that the pains are strong and frequent. Should this not be the case, the brain must be evacuated, and extracting force applied.

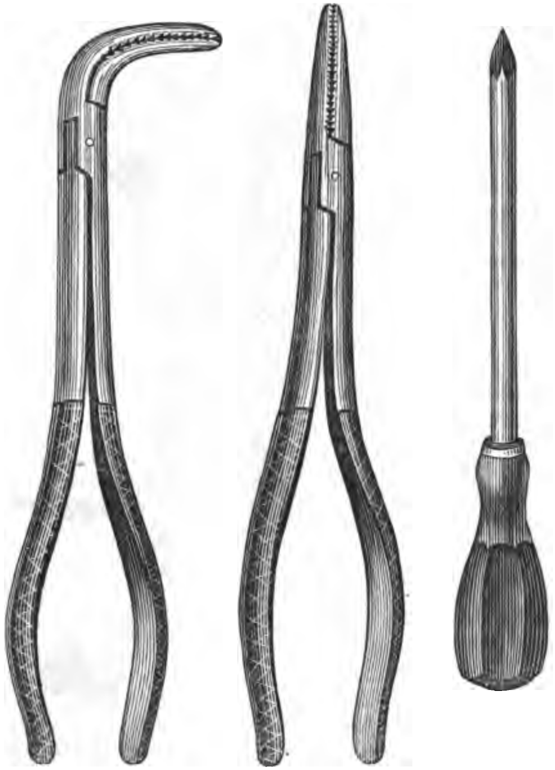
Fig. 38.



The instruments required are of two kinds,—the one to perforate the skull, and the other to extract, after the necessary diminution is effected. The first are called perforators, the second, crotchets, blunt hooks, craniotomy forceps, &c.

Mode of operating.—It is not absolutely necessary for the success of this operation, that the os uteri should be *entirely* dilated, although the wider the orifice is, the less danger will there be of injuring that organ. The rectum and bladder having been previously emptied, the woman is to be placed in the same position as in forceps operations. The perforator should then be carefully applied upon the groove between two fingers of the left hand, previously introduced, and placed upon the part of the head which it is proposed to open. It must now be passed forwards with a semi-rotatory motion until it penetrates the bone; if the *scissors* are used, the handles should be separated as widely as possible. The cutting edges are then to be placed at right angles to the first incision, and again separated, so as to make a crucial opening. The instrument should now be passed into the skull, and the brain broken up, after which it (the instrument) should be withdrawn. (Fig. 38.) Then the crotchet should be introduced in the same manner, and fixed upon the inside or outside of the head, and extraction practised, being very careful to guard the soft parts of the mother.

Fig. 39.



If the head cannot be delivered in this manner, recourse must be had to the craniotomy forceps, and the bones broken up and extracted in pieces. Sometimes the forceps may be used advantageously, where the crotchet cannot. There are a variety of instruments recommended in the performance of this operation: in the first stage, Smellie's scissors, and their modification by Holmes; an ordinary bistoury wrapped near to the point; the ordinary trocar; &c. In the second, the sharp crotchet; the blunt hook; the bone forceps of Dr. Davis; the cephalotribe of Baudelocque, jr.; the straight and curved forceps of Dr. Meigs, &c. (Fig. 39.)

After treatment.—The nervous shock will be best treated by quiet, small doses of opium, and moderate stimulation. The condition of the vagina and uterus should be carefully watched and occasionally injected with warm water. If symptoms of inflammation arise, they should be met promptly by venesection, leeching, calomel, and opium. In other respects, the patient should be treated as after a natural labour.

CÆSAREAN OPERATION.

When from any cause the antero-posterior diameter of the superior strait, or the transverse diameter of the lower, is not more than 1½ inches, there is no possibility of delivery "per vias naturales," and it becomes necessary to resort to the Cæsarean operation.

The conclusions that have been derived by Dr. Churchill from a careful examination of statistics are, "that in cases where we cannot deliver the patient by any other means, and when, consequently, both mother and child would inevitably die, we may afford each a chance by performing the *Cæsarean section.*"

The best period for operating is at the commencement of the labour, provided there be no doubt as to the necessity. The strength of the woman is then unimpaired, she can bear the operation better, and runs less risk of inflammation. For the method of performing this operation, see *text-books.*

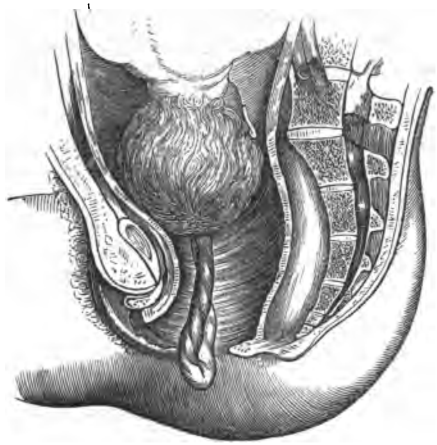
PROLAPSUS OF THE CORD,

Whenever it occurs, may become a cause of preternatural labour. It may be produced in various ways, as for instance, by transverse presentation; by over-distension of the uterus by a large quantity of liquor amnii; by sudden rupture of the membranes and a gush of the contained fluid; by presentations of the feet or knees, the lower portions of the uterus not contracting sufficiently around the child; and by excessive length of the cord. (Fig. 40.)

The *prognosis* is, of course, unfavourable, the child being very liable to perish from asphyxia produced by pressure upon the cord.

Treatment.—Various expedients have been resorted to, in order to replace the cord, none of which have been entirely successful.

Fig. 40.



It has been proposed to push it up beyond the brim and hold it there till the head has engaged; or to hook it over the limbs of the child; or to enclose it in a little bag attached to a cathether or slender rod, then return it, withdraw the rod, and leave the bag and cord in the uterus. If, however, the head has descended, and the parts are in a favourable condition, it is better to use the *forceps*. If the woman has had children, the pelvis is roomy and the soft parts dilated, and the presenting part not descended too low, the child may be turned. Should the cord have ceased to pulsate, we need not interfere.

UTERINE HEMORRHAGE.

There are three varieties of hemorrhage treated of by obstetrical writers, viz.: *accidental; unavoidable;* and *hemorrhage after delivery*. The first generally occurs before or during labour, and arises from a partial and accidental separation of the placenta, which is generally in its usual position.

The *immediate cause* of the flooding is the separation of some portion of the placenta from the womb, and laceration of its vessels; the *remote cause* may be undue muscular exertion; blows; falls; mental excitement; straining at stool; general plethora, &c.

Diagnosis.—This variety of hemorrhage is distinguished from that which depends on implantation of the placenta over the cervix uteri by these circumstances: the os uteri may be felt on examination to contain nothing but the bag of waters; that the hemorrhage occurs during the interval of the pains, and is arrested by the uterine contractions; and that we can generally make out some definite cause for accidental hemorrhage, and its occurrence is irregular.

When the blood which is poured forth from the uterine vessels on the separation of the placenta, is at once discharged externally, the nature of the case is clear. But it may happen that the blood may be poured into the bag of membranes, or between the membranes and the womb, without appearing externally, and may thus prove fatal, without the practitioner being aware of the danger.

This condition of things may be suspected, if, towards the end of pregnancy, the patient is subjected to any of the above causes that may produce hemorrhage, and if she complain of dull aching pains in the back, tenderness of the womb, with, perhaps, obvious swelling at some part of it, together with faintness, and the constitutional signs of loss of blood.

Treatment.—If the patient has not arrived at her full time, the hemorrhage is not profuse, and the os uteri undilated, there is no immediate danger. She should be placed in a horizontal position on a hard mattress, and lightly covered; cold applications to the pubes, or cold enemata, should be used. Internally, the infusion of rose leaves and aromatic sulphuric acid, or acetate of lead and opium, should be administered.

Should these measures not succeed, recourse may be had to the *tampon.* It should be remembered, however, that this instrument should *never* be employed when the uterus is *empty*, as the blood might collect within the cavity till the woman perished from the loss.

Should these means fail, there still exists another, viz.: *rupturing the membranes* and allowing the liquor amnii to escape. As soon as this is done, the uterus contracts, compresses the orifices of the bleeding vessels, and thus arrests the hemorrhage.

Should the contractions not come on, the organ may be stimulated by the administration of ergot, and friction over the abdomen. The os uteri is generally so relaxed by the hemorrhage as to be very dilatable. It has also been proposed, if all these fail, to introduce the hand, turn the child, and thus terminate the labour.

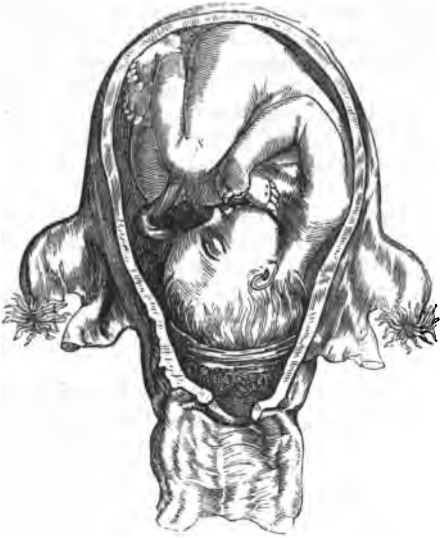
The placenta is usually expelled immediately after the child; if it be not, it is much better to extract it, and secure a firm contraction of the uterus, than to allow the hemorrhage to continue.

If the patient's strength is much exhausted, stimulants should be used, and nutritious articles of diet exhibited. It is generally considered advisable to keep down the reaction that succeeds excessive hemorrhages, by the administration of opium, combined, if necessary, with some stimulants. The patient should be kept in a strictly horizontal position till all danger of a recurrence is past.

UNAVOIDABLE HEMORRHAGE.

Placenta prævia; placental presentation.—The hemorrhage which results in this case is the necessary and unavoidable consequence of the dilatation of the os uteri, by which the connexion

Fig. 41.



between the placenta and uterus is separated; the greater the separation, the greater the hemorrhage, as the labour advances. The placenta may be situated partially, or entirely over the os uteri. (Fig. 41.) The *cause* of the hemorrhage is the separation of the placenta from the cervix uteri, and the consequent exposure of the mouths of the bleeding vessels.

Symptoms. — The first discharge generally occurs from about three to five weeks before labour commences; the amount varies, but is generally slight at first and unaccompanied by pain. It returns again after a week or so, and without any apparent cause, and thus comes and goes till the end of gestation. With the first sensible contractions, the flooding occurs more profusely, and is seen to increase *during* each pain. An internal examination is necessary to discover whether the implantation be complete or not.

Diagnosis.—This variety of hemorrhage is distinguished by the fact, that it usually begins without evident cause, and that it is increased *during* a pain; a per vaginam examination also reveals the presence of the placenta, which is distinguished from a clot of blood by its being firmer and not breaking down under the finger. If it only partially covers the os uteri, its edge will be felt continuous with the membranes, and through the latter the presentation may perhaps be felt.

Treatment.—If the hemorrhage is slight and the term of gestation not completed, palliative measures should be tried as before described. If so profuse as to demand interference, there is no hope of a natural termination, unless the pains be so violent as to force away the placenta before the child. This, however, is so rare as not to justify waiting. The only alternative is to turn and deliver as quickly as possible. It fortunately happens that the continued bleeding so softens the os uteri as to render it speedily dilatable.

The hand is to be introduced in the usual manner, and insinuated between the os uteri and the placenta, on that side on which the placenta is believed to be thinnest; the membranes should then be ruptured as high up as possible, and the feet seized and brought down. When the body of the child is in the pelvis it will act as a tourniquet, and compress the bleeding vessels. Nevertheless, the labour should be terminated as early as possible.

Some authors recommend that the hand should be pushed *through* the placenta—a thing much more difficult to effect. The placenta should always be delivered as quickly after the child as possible, and every care taken to prevent a recurrence of the hemorrhage.

Some authors recommend that if the os uteri be undilated when the hemorrhage comes on, the *tampon* should be used till dilatation takes place. This has been objected to, on the ground, that it prevents the attendant from knowing when the os uteri is dilated or dilatable, and thus valuable time is lost.

If the feet present, it is more favourable, as the operation of turning is rendered easier. If the placenta is only attached to the edge of the os uteri, and the pains are active, it should be treated as a case of accidental hemorrhage, by rupturing the membranes. The pressure of the head whilst dilating the os uteri will close the mouths of the bleeding vessels with the placenta, and so arrest the flooding till the child is expelled.

Drs. Simpson, of Edinburgh, and Radford, of Manchester, recommend that instead of *turning* in these cases, the whole placenta should be *detached* and *extracted* if possible, before the child. The following are Dr. Simpson's conclusions, based on the examination of a large number of cases.

1st. That the complete separation and removal of the placenta before the child, is very seldom followed by any great hemorrhage.

2d. That, on the other hand, the previously existing hemorrhage almost always ceases from the moment the placenta is *perfectly* and completely detached from its connexions with the uterus.

3d. That the cessation of the hemorrhage is explicable, not on the idea that the descending head of the child acts as a plug or compress upon the exposed orifices of the uterine sinuses, but on the mutual vascular economy of the uterus and placenta, and the circumstance that the hemorrhage principally comes from the partially detached surface of the latter. The practice has been condemned by other eminent authorities, and it is recommended, even if it be adopted, to seize and bring down a foot if it can be readily found; if it be determined not to turn, it is also recommended to give a scruple of ergot at the moment of separating the placenta, so as to bring on early uterine contractions.

Hemorrhage after delivery.—The discharge in this case also proceeds from the mouths of the vessels exposed by the separation (either partial or complete) of the placenta. A certain amount is lost after the birth of the child; it is only when it becomes so profuse as to threaten serious consequences, that interference becomes necessary. It may occur after the escape of the head, while the body is retained; immediately after delivery; or at the interval of ten or twelve days after.

The hemorrhage may arise from *inaction* of the womb; from an absence of that contraction which is the only safeguard. The uterus is felt large and flabby in the abdomen; the pulse becomes weak and tremulous; the patient restless; there are constant and deep sighings and groanings, and frequent syncope, dimness of sight, and ringing in the ears, and even convulsions. These symptoms, together with the escape of the blood, will be sufficient to establish the diagnosis.

Treatment.—In every case, the indication is to *make the womb contract.* This may be done in various ways, viz., by friction to the abdomen; by the application of cold to the genitals, or abdomen; by grasping the womb through the abdominal parietes; at the same time ergot should be administered to the same end. If these means fail, the hand should be introduced into the cavity of the organ, with the hope of exciting contraction. It has also been recommended to introduce ice into the uterus; or a freshly cut lemon, and then to squeeze out the juice upon the internal surface.

Among the internal remedies are, acetate of lead and opium; alum; and magnesia. Pressure upon the abdominal aorta, and ligatures upon the limbs, are highly praised by some authors. Velpeau recommends the application of a sinapism between the shoulders as a revellent. Dr. Radford recommends galvanism as a powerful excitant of the uterine muscular fibres.

The hemorrhage may, however, be attended with partial adhesion of the placenta to the uterus, with an irregular spasmodic or *hour-glass* contraction of the latter organ. In this case, having placed the left hand on the abdomen, so as to grasp and steady the womb, introduce the right hand, in a conical form, gently through the constricted portion of the womb; separate the placenta, and then the contractions of the uterus will probably expel the hand and placenta together.

The operation of transfusion has been recommended and practised by Dr. Blundell in cases of extreme danger from loss of blood, and has proved successful in fourteen cases, although it has failed in an equal number.

The patient should be kept in a strictly horizontal position, and if syncope occurs, the head should be lowered and the feet elevated, so as to allow the blood to flow to the brain. Stimulants should also be administered, and the room kept cool and well ventilated. The after treatment is the same as in the cases already described.

PUERPERAL CONVULSIONS.

There are three varieties spoken of by obstetrical writers, viz., the *hysterical*, the *epileptic*, and the *apoplectic*. The first occurs generally during the early months of gestation, and in females of a nervous or hysterical constitution. It is distinguished by the absence of insensibility, and frothing of the mouth, and the convulsive movements of the lower jaw. There is no stertorous breathing, and but slight contortion of the body; although in many cases, the muscles of the back are violently contracted, a symptom which is looked upon by Dr. Dewees, as pathognomonic of this form. The paroxysms often terminate in screams and tears, and the discharge of a large quantity of limpid urine.

Treatment.—If there be a quick, full pulse, or headache, venesection may be practised, or a few leeches applied to the temple. In general, the attack is relieved by antispasmodics, such as musk, camphor, valerian, or assafœtida. Cold water poured from a height upon the head will often break up the paroxysm. When it has ceased, a small dose of opium should be administered.

Epileptic convulsions.—The symptoms resemble those of an ordinary epileptic attack, and the patient often has premonitions of what is coming, from the presence of pain in the head, ringing in the ears, obscure or partial vision, loss of sensation, rigors, nausea, &c. The *aura epileptica* is seldom felt.

The *attendant symptoms* are, a turgid purple condition of the face; convulsive movements of the face and whole body; foaming at the mouth; repeated and sudden closure of the under jaw, by which the tongue is often dreadfully bitten; the respiration is at first irregular, and being forced through the closed teeth, and the foam at the mouth, has a peculiar hissing sound, which, once heard, can never be mistaken; the pulse is quick, full, and hard at the beginning, but afterwards becomes small and scarcely perceptible; the urine and fæces are often discharged involuntarily.

This fit lasts for a time varying from five minutes to half an hour, and then gradually subsides; the pulse often becoming calm, and the patient conscious; or she may remain in a state of complete coma with sibilant or stertorous breathing; the more profound the coma, the greater the danger.

The calm is generally short in duration, being often followed by a recurrence of repeated paroxysms and intervals.

Puerperal convulsions may come on either before, during, or after labour. When they occur before labour, uterine contraction is very apt to come on synchronously with the fit, and the child is born dead. When they occur during labour, the latter runs nearly its natural course, and the fits are synchronous with the pains, though not recurring with each. When they occur after labour, they generally take place from two to four hours after the child is born, and are attributable to some injury received by the brain and nervous system during the parturient effort.

The *causes* are generally a loaded state of the stomach or bowels; intemperance in eating or drinking; fright; and in most cases, an accumulation of blood in the brain during the violent expulsive efforts. Primiparæ are more frequently attacked than multiparæ.

Treatment.—The first indication is to protect the brain from the effects of an accumulation of blood. This should be done by taking away blood, in a full stream, from the arm, or temporal artery, and repeating it if the paroxysm continue. This may be followed by cups or leeches to the temples and back of the neck; there is great tolerance of bloodletting in this disease.

A strong purgative should next be given (such as calomel and jalap), and its operation assisted by stimulating enemata. It has also been recommended to combine tartar emetic with the purge, or to give it alone, in divided doses, after the bowels are moved. The head should be shaved, and cold applications made to it.

In regard to the *use of opium*, most practitioners are in favour of it when judiciously used. If it be given in the commencement of the attack, when the patient should be bled, it can only hasten the fatal result. But if the fits continue, *especially after delivery*, with signs of great irritation and exhaustion, it may be given with the hope of deriving benefit, remembering that depletion should always be premised.

Should the process of labour or parturition be interfered with? If the convulsions occur during gestation, the uterus should not be interfered with. Should they occur at the commencement of labour, the propriety of interference may be questioned; the safest plan is merely to rupture the membranes (provided the os uteri is dilated or dilatable), which sometimes hastens the progress of the labour. *Version* has been condemned. When the head has descended into the pelvis, and there is sufficient space, the *forceps* should be used. The attempt should be made during an interval of the paroxysm; should the fit recur at this time, the blade should be withdrawn, for fear of injuring the mother.

Should the head of the child be fixed in the pelvis, so as to be immoveable with the forceps, it may be necessary to open the head. Before this is done, however, all the attendant circumstances should be carefully weighed; the child may be alive; the labour, if left to itself, may terminate naturally; and lastly, even if terminated by art, the fits may not necessarily cease.

Apoplectic convulsions.—Generally speaking, in this form there is little or no convulsions, no distortion of the face, and no frothing at the mouth; the muscles are flaccid and powerless; the respiration is stertorous, the patient is insensible, and there is generally no repetition of the paroxysm.

The attack is generally preceded by headache, ringing in the ears, total or partial blindness, and flushing of the face. The pulse is full, slow, and laboured during the attack, and the pupils insensible to light. This form almost always occurs during labour, and is caused by the violent strain upon the cerebral vessels during the expulsive efforts.

Treatment.—Bloodletting in a full and copious stream, either from the arm, jugular vein, or temporal artery. This should be repeated if needful, or followed by local depletion, in the form of cups or leeches. If the patient is benefited by it, the head should then be shaved and ice applied, and the bowels freely evacuated.

If this variety occur during labour, and the uterine action be suspended, the patient should be delivered as speedily as possible, in order to save the child; for this purpose, if the head be within reach, the forceps should be applied. The after treatment of all these cases requires the greatest watchfulness and quiet. Should the patient become maniacal, all sources of irritation, within and without, should be removed, the patient kept quiet in a dark room, and under the influence of tartar emetic.

PUERPERAL FEVER.

This malady has received various names, such as *childbed fever, puerperal fever, peritoneal fever, puerperal peritonitis, low fever of childbed,* &c.; by some it has been considered as a fever dependent on local inflammation, by others as a blood disease. Each author who has written upon the subject, has adopted a classification in accordance with his own views and experience; it would be impossible, therefore, in a work of this kind, to give a synopsis of *all.* "The student is liable to be deceived, if he grounds his ideas of this malady solely on the observations of one or two writers, especially those who have witnessed epidemics as they have appeared in hospital practice, however graphic the representations may be; because scarcely any two have resembled each other; and because the symptoms in all cases are much modified by the temperature and other qualities of the atmosphere, the season of the year, the localities in which the disease appears, and several external circumstances, independently of the constitution of the patient herself."*

There may be said to be *four* principal varieties of this disease. The *first* and most common variety is characterized by pain and tenderness in the abdomen, preceded by a chill, and accompanied by a hot skin, rapid pulse, and sometimes profuse perspiration. In this form the uterus and its appendages, or the peritoneum, receive the greatest force of the blow.

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* Ramsbotham, p. 415.

The *second form* assumes the character of a mild typhus, accompanied by intestinal irritation. It is ushered in by rigors, followed by a hot fit; and succeeded by nausea and vomiting or diarrhœa, with most offensive evacuations. The tongue, at first loaded and white, soon becomes preternaturally red, as in those affected by chronic dysentery. The skin is dry and hot, and of a dusky yellow hue; the mind is unsettled, without being absolutely delirious; the debility is extreme, and the limbs tremulous. In some cases these symptoms are followed by acute inflammation of some important organ, or of the joints, softening of the womb, suppuration of its lymphatics, or veins. There is usually suppression of the milk, and sometimes of the lochia.

In the *third variety* the main mischief seems to be expended on the nervous system; there is great delirium, agitation and sense of impending death. This form is liable to be followed by fatal syncope and coma, and may supervene on either of the others.

The *fourth* and worst form of puerperal fever affords the most extensive evidence of the diffusion of a poison over the system through the blood, and presents the most perfect analogy with scarlatina maligna. Shivering, and abdominal pain, are followed by rapid exhaustion, quick pulse, glassy eye, and dusky skin. There are often pain in the chest, husky cough, laborious breathing, and other evidence of inflammation of the lungs, which after death may be found gangrenous. Abscesses of the joints and cellular tissue; phlebitis, and gangrene of the intestines, are among the ravages of this most fatal malady.

There are a few *general symptoms* which may be added to those mentioned above as characterizing the different forms. The pulse is always accelerated, ranging from 110 to 140, or 160; in the inflammatory form it is full and hard; in the adynamic, weak and small; pain is not uniformly present, though most generally; there is great tympanitis, and generally constipation. The lochia and milk are usually suspended; the urine is suppressed, or voided with great pain; tormina and tenesmus are present; and there is often a vomiting of yellow or green bitter matter, and in the last stage a discharge resembling *black vomit.* The intellect is often undisturbed to the last, though the patient often takes a great aversion to her infant.

Numerous *causes* have been laid down as productive of this disease: among the predisposing, are atmospheric vicissitudes, depressing passions, unhealthy residences, dissipation, bad diet, &c. Among the exciting are, epidemic influences, intestinal irritation, retained placenta, difficult labour, suppression of lochiæ and lacteal secretion, and *contagion.*

There are many who look upon this as a *blood disease*, who believe that puerperal fever originates in a vitiation of the fluids; and that the causes which are capable of vitiating the fluids are particularly rife after childbirth; and that the various forms of puerperal fever depend on this one cause, and are deducible from it. Others, on the contrary, believe that the primary impression is made upon the nervous system.

The *treatment* must vary according to the form of disease we have to contend with. In the first, or inflammatory form, instant recourse must be had to bloodletting, which must be pushed to the extent of syncope, if necessary. The abdomen should then be covered with leeches, which are to be followed by hot fomentations. The bowels should also be freely opened with a purgative, after which calomel and opium should be administered, with the view of producing their constitutional effects.

In the *second form*, bleeding, except in the early stage, will be generally improper, and even then should be restricted to plethoric patients. The principal reliance must be placed on purgative medicines, as salines and mercurials. A full dose of calomel should be exhibited, and followed by a purgative; after free evacuation, calomel and opium should be administered. After the bowels are unloaded, purgation should cease, as it rather causes depression; mercurials and salines, or tonic stimulants and carminatives, should be used, according as the disease shows marks of excitement or depression. In the low form, bark, camphor, or ammonia appear to be particularly indicated.

In the *third* or nervous form, warm purgatives should be administered, or laxative enemata, after which a few doses of opium should be exhibited. Bloodletting is generally uncalled for.

In the *fourth* variety, the two indications are: *First.* To attend to the local lesions. *Second.* Never to forget that these are not the disease, but merely the effect of a more diffusive, though concealed cause, to act on which our remedies should be directed. The rationale of the treatment, therefore, consists in the exhibition of such remedies as will act on the cause, and such as will alleviate or remove the local affections; taking care that in our attempt to effect the latter end, we do not so act on the constitution as to give additional energy to the more deadly power of the concealed cause. (Ferguson.) In the early stage, leeches, blisters, calomel, and opium, &c., should be used as required: and in the latter stage, stimulants and tonics.

MILK FEVER.

The milk fever generally begins on the third day after delivery, sometimes on the first or second, or not until the fourth, fifth, or sixth. It is ushered in with chills, headache, pains in the back and limbs; the pulse, at first small and hard, soon becomes developed, and the skin hot; the breasts grow hard, swelled, and painful in a few hours, so as to prevent the motion of the arms. This condition of things is followed by a sweat, and the fever abates in the course of twelve or twenty-four hours, and the secretion of milk is established; the breasts, however, remain tumid and painful much beyond this period, especially in women who do not give suck. The lochia, too, are often suspended or diminished during this time.

Treatment.—The bowels should be freely moved by the administration of a saline cathartic, or oil. If the fever runs high, a small bleeding should be practised. If the breasts are painful to the touch, they should be covered with warm emollient poultices, and if not relieved by this, a few leeches should be applied to them.

These means are important to prevent the formation of a mammary abscess. The breast should not be allowed to fill with milk, but should be drawn either by the child or artificially, as often as it becomes distended. Should suppuration unfortunately take place, the pus should be evacuated as soon as possible, and a warm poultice applied. If sinuses remain from the burrowing of pus, compression should be made upon the gland by means of adhesive straps. If a milk fistula should be the result, the orifice should be filled with a tent, and the wound allowed to granulate from the bottom.

INVERSION OF THE WOMB.

The inversion may be either partial or complete. *Partial inversion* may be known by the absence of the fundus behind the pubes, and the presence of a large solid tumour in the vagina, accompanied by profuse hemorrhage, intense pain in the pelvis, violent tenesmus, vomiting, fainting, cold, clammy sweat, and feeble or imperceptible pulse.

Complete inversion is recognised by the presence of a reddish, livid tumour, filling the vagina, and protruding beyond it, resembling in shape the uterus after delivery. The os uteri may be felt at the superior extremity of the tumour, forming a kind of circular thickening at its apex, and the uterus is wholly wanting in the hypogastric region.

Causes.—It may occur spontaneously in atony of the uterus, or from irregular contractions. Violence in extracting the placenta; shortness of the cord, delivery in the upright position, tumours of the uterus unconnected with parturition, have all been mentioned as causes of this accident.

Treatment.—By some it is recommended to compress the tumour and pass it in through the vaginal orifice, followed by the hand, which, when in the vagina, should be formed into a cone, and made to press mainly upon the fundus uteri; after a while it will be found to recede, and on being farther pressed, it suddenly starts from the hand, and the organ is returned to its natural condition.

Others advise that no compression be made; the womb should not be handled, but watching it carefully, at the moment when free from contraction, the fundus should be pressed with one finger and indented like the bottom of a bottle; when that much is effected, the reposition is sure, provided continual pressure be made: the fundus will be pushed up again through the os uteri and vagina, until the hand is found high up in the cavity of the uterus.

If the placenta be adherent, some recommend that it be reduced with the fundus; others, and the majority, that it be first removed, and then that reduction take place, as this procedure will facilitate the operation.

THE END.

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